AIR WONDER • STORIES

AUGUST
1929
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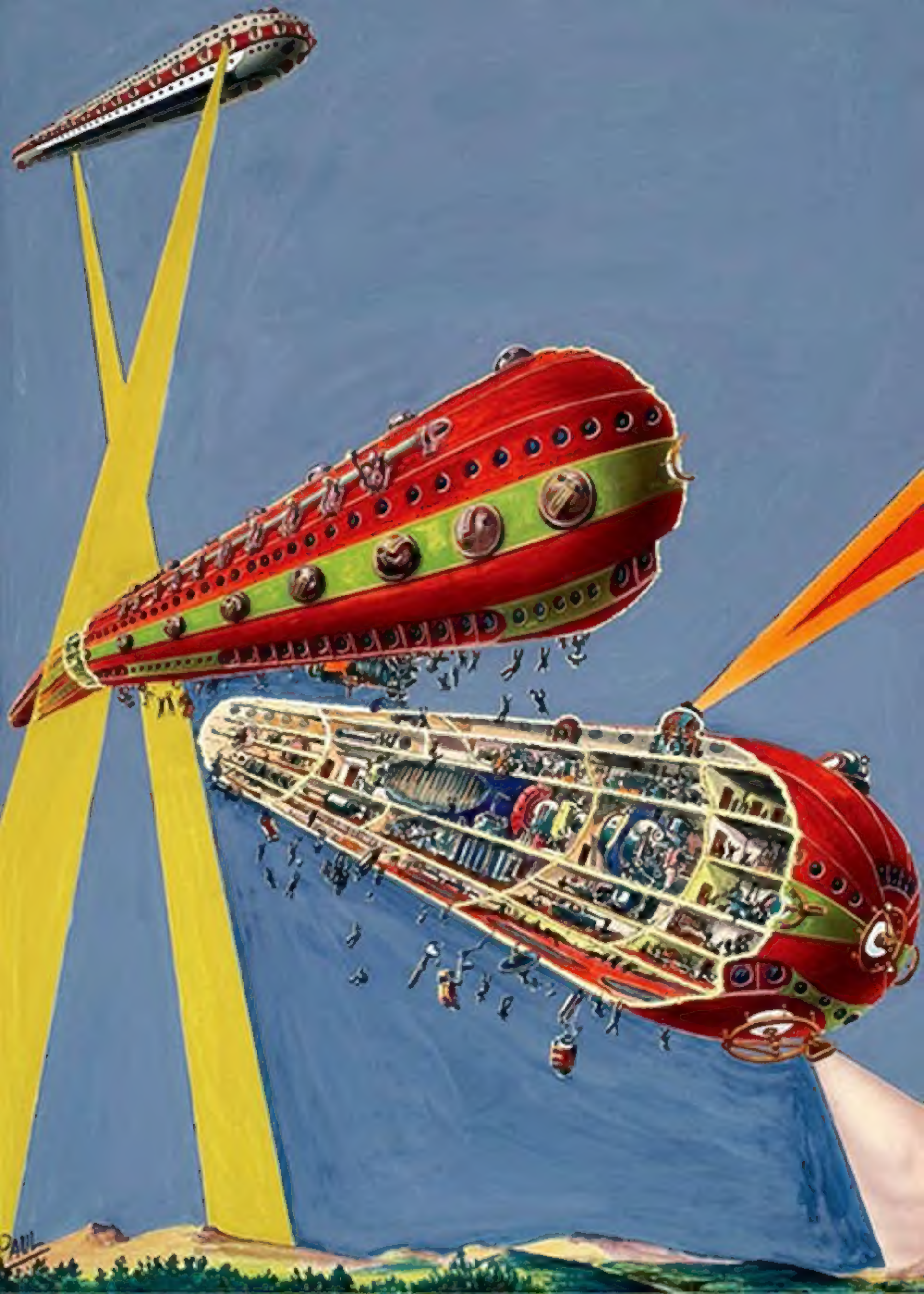
HUGO GERNSBACK
Editor

A GERNSBACK PUBLICATION

Science-Aviation Stories by
VICTOR MacCLURE
HENRIK DAHL JUVE
EDWARD E. CHAPPELOW


PAUL

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On the Cover

this month is illustrated the story "THE SILENT DESTROYER," by Henrik Dahl Juve. Here we see graphically what the atomic rays from the Occidenta destroyer do to the Orienta flyer. The enemy ship is cut in twain from one end to the other as a knife cuts through butter. A passing sweep cuts off the tailpiece and the enemy ship is hurled earthward to destruction. It demonstrates the tremendous power of atomic rays once they have been developed, as they surely will.

NEXT MONTH

THE ARK OF THE COVENANT, by Victor MacClure. We are now getting into the heart of this great mystery and we find that the interest and suspense in the story keeps on increasing to the inevitable climax. Yet, the author always keeps ahead of you and you are never permitted to guess the solution to the great problem. The next installment is particularly interesting and thought provoking.

THE YELLOW AIR PERIL, by Harl Vincent. This well-known author has a technique all his own and as an engineer of one of our great industrial institutions, he knows his science as few authors do. In the present story, he has shown us how the possession of some great scientific secret as applied to aviation may be used by unscrupulous powers.

FLIGHT IN 1959, by Bob Olsen. This versatile writer has produced one of the outstanding air stories of the year and it will be long before it is surpassed. It certainly contains a terrific amount of most excellent glimpses of what the world of aviation will look like in 1959. This story is prophetic in many instances, and incidentally, Mr. Olsen has supplied a few inventions of his own, which we are certain will be realized in the very near future.

THE AIR TERROR, by Lowell Howard Morrow. You remember "Islands In the Air" by this well-known author. Here he is back with a most exciting air story full of adventure, science, fight and daring. Incidentally, it contains excellent aviation-science that will hold you spellbound until you finish the story.

AND OTHERS.

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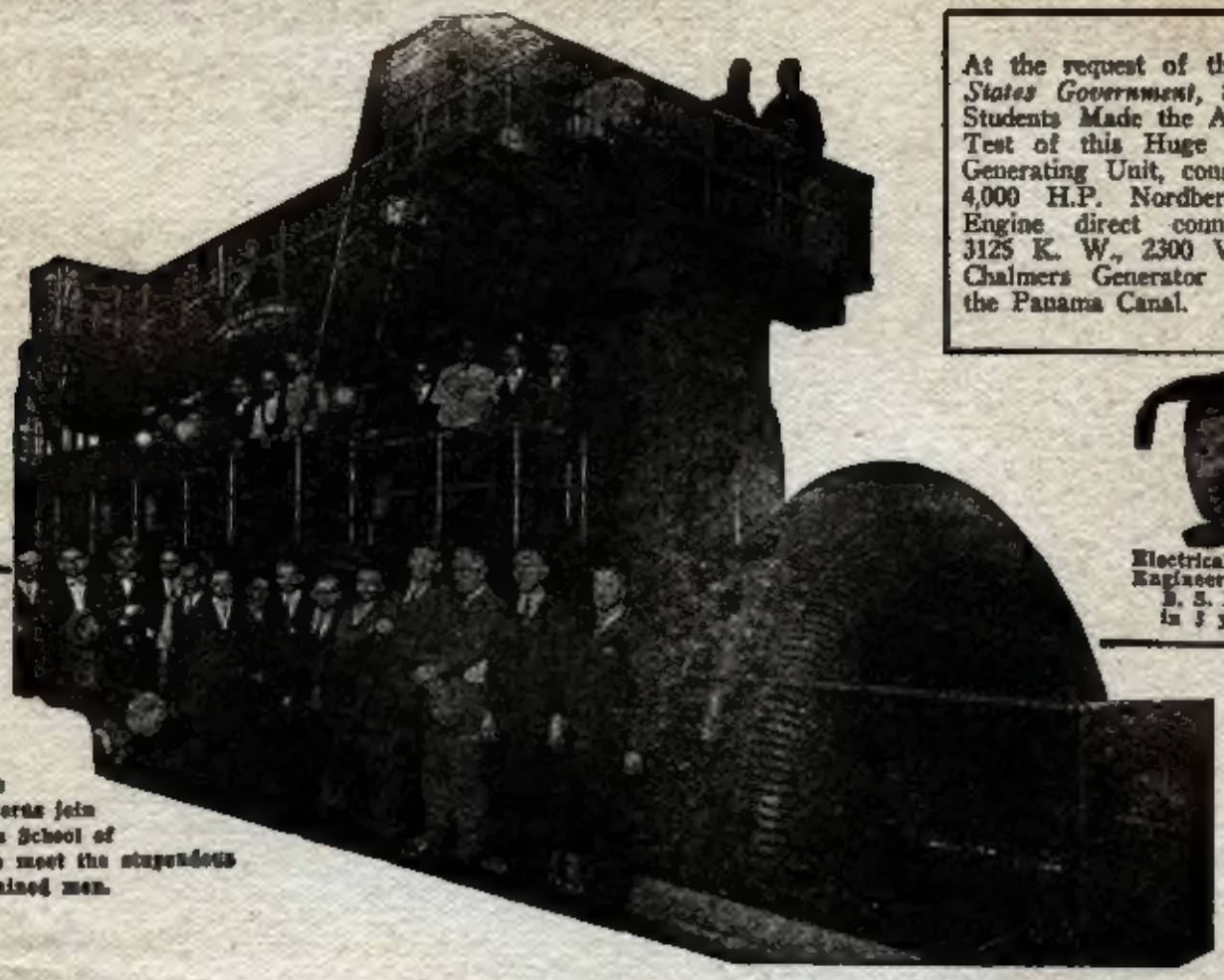

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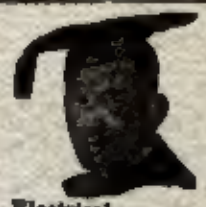

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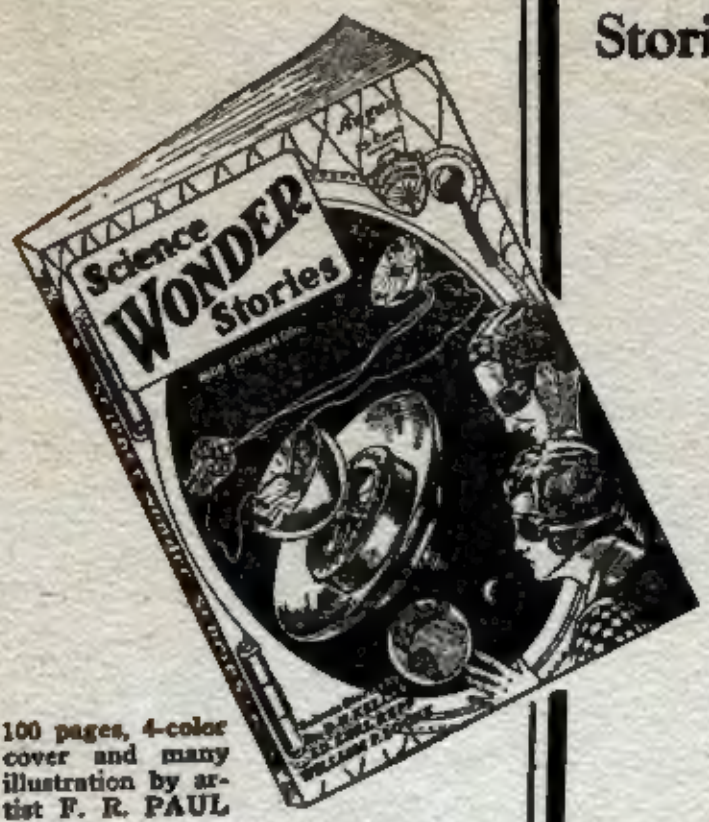

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AIR WONDER STORIES

AUGUST
1929

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The Future of Aviation Springs from the Imagination

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These aeronautical experts pass upon the scientific principles of all stories

FUTURE AVIATION PROBLEMS

By HUGO GERNSBACK

WHEN we look back to the first box-kite planes which the Wright Brothers used in their historic experiments and compare them with our present all-metal tri-motored planes, we are apt to say that aviation has made notable progress. Indeed, there are those well-meaning but misguided individuals who believe that there isn't much to invent, anymore, when it comes to airplanes. They take the view that the airplane has almost reached perfection and that like radio sets, future development will be only in the matter of refinements.

The truth is, and most aeronautical experts realize it, that as yet we have not scratched the surface. Just as the original Wright motored airplane looks ludicrous to us to-day, so will the present-day airplanes look silly 25 years hence.

What the ultimate vehicle of the air will look like, no one can predict accurately to-day. Exact developments as to shape, equipment, power, no one can foretell. The one sure thing, however, is that the airplane 25 or 50 years hence will certainly not look like the present-day machines.

In the first place, the gasoline motor will have given way to something far more efficient. The gasoline engine has entirely too many parts and there are too many things apt to go wrong with it. What sort of fuel and what sort of engine we will use 25 or 50 years hence, no one knows. We may have an electric motor-drive or some entirely new explosive engine, of a type unknown to-day.

The commercial passenger airplane of the future most assuredly will be constructed entirely of metal. There is no good reason to suppose that it will be limited in size even to the size that we call "monster" to-day. We will probably see the 25,000-ton aircraft in the heavier-than-air type. Such machines will carry heavy freight as well as passengers, the same as ocean greyhounds are accustomed to do to-day. It is even possible that such flyers will make no stops, except between long-distance terminals.

Thus, for example, it is likely that a plane of the future will start from New York and not stop till it reaches Los Angeles or San Francisco. Passengers will be taken off or on at intermediate points by smaller aircraft, but the big machine will probably not even slow down. In this way, maximum speed and economy is assured. The plane will be refueled in the air.

One of the most difficult problems that aviation has to concern itself with at the present time, is the landing field. It is the height of foolishness to cover the distance between airports, for instance, New York and Boston in one and a quarter hours, while it takes a passenger almost as long or longer to travel from the city to the airport in New York and the same length of time after it arrives in Boston.

It is our feeling that airports are a makeshift which will certainly not prevail in the future. As quickly as the problem of hovering flight is solved, the airport will have to go. Of course, the solution of the hovering flight is as yet not in sight, that is, not from a practical standpoint.

To be sure we have, at the present time, made some headway in the helicopter of the so-called wind-mill type. But even that takes up too much room for take-off and landing.

As long as an airplane cannot take-off from or come down on top of a city roof in all sorts of weather, the hovering flight has not been solved. We are certain, however, that within the next 50 years, this problem will have been solved and most likely in a rather simple manner.

It would even be possible that the present-day airplane with certain fundamental changes, could be turned into a helicopter by using the wings of the airplane itself as horizontally revolving blades. In other words, if some means could be found to spin the present airplane wings with some structural changes around their own axis in a horizontal plane, I believe a workable helicopter could be evolved.

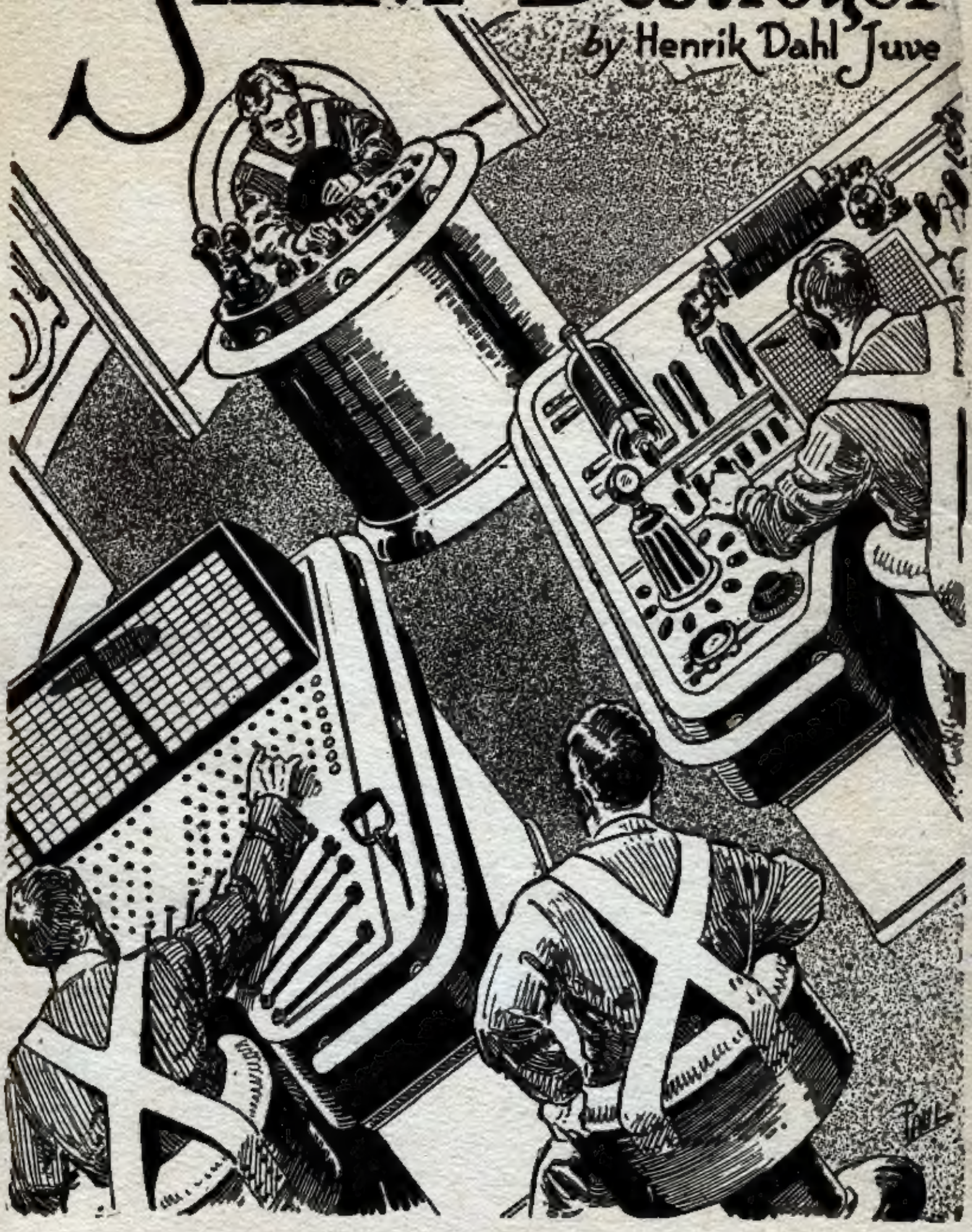
By means of extra propellers at the tips of the wings, one revolving in one direction, the second one in the other direction, it is possible in this manner to actually spin the wings. Some means would of course be found to keep the fuselage from rotating as well so that the occupants would not become dizzy while the wings spin on their axis.

This is, of course, only one idea, but many others will probably be evolved in due time.

But one thing is certain, radical changes must and will come. The world awaits *a new principle in aviation.*

The SILENT Destroyer

by Henrik Dahl Juve



Addison watched in fascination, as Eventrude's fingers played over the board. The image of the enemy ship danced and bobbed unsteadily, moving persistently across the screen.

CHAPTER I
A Visitor From the Past

CAPTAIN BURKE GAUTHIER stared over the wilderness about him with unseeing eyes. Among the new crop of saplings a herd of deer grazed quietly, their shadows lengthened by the setting sun. Nearby, two cub bears rolled and tumbled about in a fierce sham battle; while in the trees the birds twittered contentedly as they snuggled down for the night. High in the air huge cigar-shaped monsters flashed silently by with a momentary glistening of soft evening colors from their silvery envelopes. One separated itself from the orange glow of the sun, zipped by close overhead and vanished behind the hills to the west.

"I see that the New York-Shanghai Limited is on time," said a voice behind the brooding captain. It was a soft, cultured voice that fitted strangely into the atmosphere of quiet, purposeful activity in the sky.

The captain turned slowly to see his chief officer, Lieutenant Evenrude.

"Yes," he said in the same well modulated tones. "Evidently our forces are successful in holding the ground they have taken in eastern Orienta."

Lieutenant Evenrude regarded his quiet, thoughtful superior for a moment as though hesitating. "Anything new from G-2 staff meeting this afternoon?"

"Yes. We think that we know where the Orienta forces are making their anti-nullifiers. That is where Ghorski will be stationed. We have instructions to stand by at midnight for action orders—you know what danger that means when I explain that G-2 thinks that if we can capture Ghorski we may stop the war. They base their reasoning upon the assumption that the traitor has taken no one into his confidence, but is keeping the anti-nullifier a secret to elevate himself to power among the Orientals. It's strange that the Occidental Government should be so careless as to permit one such as he is to share their most carefully guarded secrets. But to capture Ghorski!"

"He was alright when his aura was photographed upon his admission to the service. He must have changed almost completely since then," suggested Evenrude. "There are rare cases where this has happened," he added.

"Yes, I know. They should check up on those in high confidence every few months as some psychologists have been advocating. Perhaps all this trouble could have been avoided. But since it is done and the war is flaming, it is our duty to stamp it out as best we can."

This conversation was interrupted by a crackling in the underbrush and presently a man emerged from the wilderness. The captain stepped toward him and arrested his progress.

"My friend, don't you know that you are on forbidden ground. Have you a pass?"

HENRIK DAHL JUVS

"No!" said the man in a voice comparatively harsh as compared to the soft tones of the two officers. "I just changed dimensional consciousness and happened to land in this woods. Where am I?"

The two officers looked at the man's face and then stared more intently with a flicker of amazement in their eyes.

"Haven't I seen you before—or perhaps your picture?" asked the captain. "Yes, I recall now—in our fifth grade history covering the twentieth century there is an account of Theodore A. Addison. You are the living image of him!"

"The same," the man answered with a wrinkle of amusement about his eyes. "I have been living in the fourth and fifth dimensions and during my experiments discovered a means of changing consciousness and clothing myself with three-dimensional matter. But where am I?"

"You are but a short distance west of New York City and happen to be on ground closed to all except those of a character trustworthy enough to be entrusted with some of the most cherished secrets of the Military Department. On which side are you?"

"Which side? What do you mean?"

"Pardon me, I did not think about your having lived in other dimensions, but we are at war so you understand that my question is natural."

"I see. Of course I am an American and my sympathies are naturally with the United States."

"You are slightly behind the times, if you will excuse my way of putting it. You are trying to cramp yourself into terms of the twentieth century while this is the twenty-eighth century. And times have changed slightly. All of the white people have combined to form one nation called Occidenta and the colored nations have united to form Orienta. But we cannot accept your statements; you shall have to go to the classifying laboratory for a pass. Lieutenant Evenrude will accompany you."

When the two were gone, Captain Gauthier walked to a huge boulder into which he disappeared through a door in the side.

IN presenting this extraordinary story to our readers, we make a prediction and state, that it is without a shadow of a doubt scheduled to become a classic in aviation fiction. There is enough science contained in this single story to provide sufficient ammunition for a dozen others, which will give the reader an idea of the tremendous wealth of science contained in it. Five hundred years hence, the conditions and instrumentalities used by the author in this story will probably become part of our world. In any event, the story gives us as accurate a prelude to the future as it is possible for a trained scientist to give. And with the skill of a magician, he weaves the incidents so that the final climax of the story is so subtle, that it leaves one chuckling. Particularly is this story recommended to those of us who are used to, and must live among, irritating noises during their entire lives.

A Visitor Enlightened

CAPTAIN Gauthier was sitting at his desk in the underground laboratories and hangars when Lieutenant Evenrude, accompanied by

Addison, reported an hour later. Silently the lieutenant handed to his superior the pass and classification papers made out to Addison and stood by while the captain examined them.

"You stand high in the confidence of the Occidental Government," he said as he gave the pass to Addison. "You are free to go anywhere you choose."

"This 'classification' routine interests me—this 'forbidden ground' interests me—these two nations interest me—everything interests me. I should like to stay here until I get my bearings in this changed world if I may," quietly replied the man of the twentieth century. He had caught the carefully modulated speech of this day and was striving to soften the harsh, unpleasant tones that was peculiar to his own time.

"How do they classify one?"

"We are expecting orders to go out on a very dangerous mission, but while we are waiting we can become acquainted. During the centuries since you labored as an inventor, science has practically supplanted superstition. Denominational religion, as you knew it, has disappeared and science has taken its place. Our mathematicians have extended their theorems into the seventh dimension which we believe to be the highest in the particular universe in which we exist. The control of people through fear of the unknown has given way to the power of knowledge and it is through knowledge that science is now striving to control the behavior of people.

"Even during the middle ages, the Steel Age, as we call it, scientists discovered that the human body is surrounded by an *aura* and that the condition of this *aura* reflects the state of health enjoyed by the individual. Through the use of better filters and highly developed photography we have gone farther and found that the color and other characteristics of the *aura* give us an index to the mental and moral development of the person. By studying the colored photograph of the *aura* we can determine with reasonable certainty the reaction the individual will exhibit to any ordinary stimulus. Before elections the *aura* photographs of the candidates are circulated and the people can then judge for themselves who are best fitted for office. It is our purpose to place only high-minded men in any position of trust whether public or private. Those with criminal tendencies are suppressed and kept where they cannot do any serious harm. We have succeeded in weeding unworthy men out of office, until now corruption among government and corporation officials is practically unknown.

"Now you will understand why we were careful in answering your questions until we had your classification papers. You will notice that in the picture of your *aura* a clear blue predominates. That indicates a marvelous mental development. This fringe of bright gold indicates a fine moral and spiritual development. On the other hand, an *aura* that is roily, such as a brick red, dirty brown or gray, belongs to the type we suppress. In extreme cases it may be a smudge of black.

"You probably wonder at the color of the clothes which were issued to you upon your classification. You will observe that your clothes are of the same color as your *aura*, that all may see to what state of development you have attained. This is a great factor in stamping out deceit and crime, for it is now impossible for a 'wolf to stalk in sheep's clothing', as it were. Of course, when the system was first inaugurated a few tried to wear false colors but were apprehended almost immediately and, needless to say, never repeated their duplicity."

"I understand." Addison nodded. "Now if I could bother you for information concerning the 'forbidden ground'".

"Surely," said the captain. "I am an officer in the G-2 department of the Occidental army. In other words, I am attached to the secret service. Our activities include more than the ferreting of information from the enemy. This underground laboratory is unknown to all except those whose *auras* are very nearly perfect. It is through this scientific classification that we are able to maintain this secrecy. Here we experiment with and build anti-nullifiers for military use. Until the war broke out, it had been merely a precautionary measure to be used in controlling the colored races, especially the black race on the African Continent, until they had progressed to the stage when they grasp the idea of self-conquest and are self-regulating—"

Ready to Depart

ADDISON was about to interrupt with a question when the adjutant snapped off the lights and their attention was attracted to a lighted screen on one wall. A face appeared and words mentioning this identity sounded over the radio. The face disappeared and the screen was filled with the image of a sheet of blue paper covered with typewritten words. The adjutant touched a button and the image faded away. Almost instantly the lights were turned on and the adjutant handed to the captain a photographic film which he had taken from a compartment in the wall opposite the television screen. Addison, following the lieutenant's example, looked over the captain's shoulders while he read from an exact facsimile of the image that had appeared on the screen.

While Addison wondered at this total lack of military discipline, the captain finished reading and said quietly, "Action orders. To stations."

Addison hesitated, "May I go?" he asked uncertainly.

"Surely, although I warn you that our mission is very dangerous. You must assume all responsibility for your presence."

With a simple "Yes", Addison followed the two men through several large rooms where men were at work before machines. He marvelled at the lack of noise.

"I noticed that everything is so silent and swift and efficient," he said to the captain.

"Yes", the officer fell in step with Addison. "Even during the Steel Age the people were beginning to outlaw noise. We find it unnecessary, and abhor any noise or harsh voices."

Suddenly Addison stopped. He had been so interested in his questions that he had not noticed that, although they were underground and that it was night outside, the rooms were lighted as though by sunlight, and further that there were no shadows. In fact, the light seemed to come from all directions, but was so evenly distributed that it did not hurt his eyes.

"How do you illuminate the place?" he asked in surprised tones.

"I shall explain when we are aboard the ship," the captain smiled. We have orders to depart immediately so cannot stop now."

They left the factory rooms and after walking through a wide corridor emerged in a huge cavern

where rested a row of torpedo-like ships, each some five hundred feet in length and fifty feet in diameter. Addison, with his characteristic eye for details, counted twenty of the metallic, sky-blue shapes. Here and there crews of men worked silently about the monsters that towered high above them. The captain touched a button and there sounded in the silence of the vast cavern the faint musical tinkle of a bell. The sound was followed by two short rings and Addison was amazed and awed to see one of the huge monsters rise slightly and, like a sinister phantom, drift slowly and soundlessly through a great door into another room where it settled gently upon bunks built on the floor. His scalp tightened as he watched this graceful display of ponderous and terrible forces. With the two officers, he followed the ship and the door closed silently behind them. They walked toward the center of the towering form where a door opened and a flight of steps slid to the ground.

"Watch the roof," said the captain.

The light grew dim and Addison was astonished and terrified to see the roof of the cavern settle down for perhaps a hundred feet and then split through the center, but the lights were extinguished and he could see no more until an opening appeared the length of the ceiling and the stars shone through. Silently, like the parting of drifting clouds, the roof opened until the entire ceiling was gone.

"A section of the woods is lowered, trees and all, and slid aside to let us out," the captain explained. "Come, we must get aboard."

They climbed up the stairs into a small, dimly-lighted room where the captain closed a switch and the stairs rose soundlessly, disappearing between the walls. The door closed behind them. But no sooner had the door shut, than the room burst into the usual daylight brilliance. Addison felt the sensation of rising in an elevator and turned to the captain with a question on his lips.

"Yes," said the officer, "this is an elevator. We are going to the third floor where the control room is located."

CHAPTER II

A Silent Flight

THEY stepped from the elevator into a narrow corridor and then to a large, well-appointed room, where several officers sat at desks, one of them speaking slowly and distinctly into microphones strapped to his chest. Others were operating television sets and radio apparatus.

"To whom is that officer telephoning?" inquired Addison after carefully surveying the room.

"He isn't," Lieutenant Evenrude answered. "He is a stenographer. He speaks into the microphones and his voice operates a silent typewriter in the filing room in another part of the ship. As fast as the sheets of paper are typed the filing clerk binds them into books, constituting the ship's log. But we must change shoes—here is a pair of magnetic shoes for you. You have to wear them when the gravity is nullified or you won't be able to walk about. While we are in the air nothing in the ship has weight so you understand the necessity for magnetic shoes to hold you to the deck."

Addison felt awkward in the shoes that clung to the carpet-covered steel floor. The others, however, seemed to wear them with the ease of long association. Suddenly a strange feeling came over him, his heart acted queerly and his blood rushed to his head, leaving him faint and groggy. Then he felt pulled against the floor. It relieved his heart and drew some of the blood from his head, but it was disconcerting nevertheless. The feeling that was being forced against the floor gradually lessened to be supplanted by a sensation of lightness that left him giddy. He felt as though he were some plant on an ocean floor and that his body were waving gently in the water.

With considerable difficulty Addison tottered across the room to a chair into which he attempted to drop. But attempt to sit down ended in his merely folding up. Grasping the arms of the chair, however, he drew himself into the easy depths of the thick cushions where he rested with a weightless feeling. He was able to remain so only by clinging tightly to the chair arms. There were straps attached to one side of the chair and after buckling himself in he felt more secure.

While Addison struggled to maneuver his unwieldy person about this strange place of no gravity, Captain Gauthier was busy at a desk where, Addison observed, he kept his fingers hovering over several banks of keys similar to the old-fashioned typewriter. Occasionally the captain pressed certain keys while he watched a row of small gauges along the wall, back of the desk. "Evidently the controls," thought Addison.

He felt a sudden pressure against the chair as though an unseen hand had shoved against his chest, but this sensation gradually lessened and ceased altogether. At the same time, the lights were dimmed and soft glow flashed up on the four television screens before the control table. The captain glanced over the screens, relinquished the controls to Lieutenant Evenrude with some brief instructions and then came over to the distressed visitor.

"I suppose that the sensation of flying is rather unique for one who has not traveled in anything but the old gravity-defying type of ship," he smiled.

"Flying!" Addison gasped. "Are we under way now! I have been waiting for the motors and propellers to start!"

The captain smiled. "We are now twenty miles above the earth's surface and have been traveling on our course at about a thousand miles an hour for several minutes. We nullified gravity and rose vertically. It was during this acceleration that you felt pushed against the floor, and as we reached our level of flight the negative acceleration gave you the feeling of lightness. While we were accelerating our forward speed you no doubt experienced a pressure against the back of your chair."

Addison turned this astonishing information over in his mind for a few moments and then asked, "But how do you drive this ship without motors and propellers, and what makes the vehicle so steady in the air currents?

"We have discovered a new force which we have harnessed for our needs. Immortal in our history is a Hindoo scientist of the Steel Age who conducted the first experiments which led to this development. It is the same force which bursts the seed pod and pushes the frail dandelion through the pavement, although, of course, we apply it on a much larger scale.

"We stabilize the ship with tiny, full-floating gyroscopes similar to those used in the gyroscopic compass and mounted in the bottom of the ship in a small gondola against which the gravity has not been nullified. When the ship changes its course slightly, or in other words, when the housing about the gyroscopic apparatus changes position slightly, the shafts on which

the gyroscopes rotate, close electrical contacts as they strive to retain their positions. These contacts close relays which direct the forces used in opposing the external forces striving to buffet the ship about. Using a gyroscopic control is more satisfactory than a large stabilizer, especially in a battleship, for by simply opening a multiple-pole switch we disconnect the stabilizer and take over full control of the ship during battle maneuvers. A large brute-force stabilizer would be a detriment under such conditions. All of these operations are handled by remote control from the keyboard on the control table.

Addison Marvels

"BUT you were asking about the lighting apparatus. I recall from history that at your time, during the Steel Age you thought yourselves quite accomplished when you succeeded in heating a wire in vacuum or some inert gas, and thus securing a light having an efficiency of three or five per cent. We use cold light with an efficiency of ninety to ninety-five per cent. We are using but one lamp at present in this room and it consumes a little less than three watts yet it is as effective as ninety or a hundred watt lamp of the old style.

"There is nothing mysterious about it, however, much as it differs from the old method. We use a tiny short-wave radio transmitter sealed in a tube of fused quartz. Here," he opened a compartment in the wall and took out a spare tube. "You will notice that point inside the tube—it is tipped with a radio-active material which emits a stream of electrons. The grid and plate are connected electrostatically for the feed-back. The rate of oscillation is varied until it is of the frequency of white light and the movable adjustment is welded in place with a ray welder focussed through the quartz tube. We have other lamps on board that are adjusted to emit colored light; and the searchlights we are using at the moment are infra-red. These rays are invisible but penetrate the mists well, and the reflected beams are picked up on the television plates around the shell of the vessel, being interpreted as white light on the screens before the control table. We are thus able to see where we are going and to view the ground, while to anyone without apparatus we are invisible. We have an adjustable light in another room if you care to examine it."

With the help of the captain, Addison managed to navigate into another room where the officer touched a button on the door casing and the room was flooded with white light. With a dial on the switch plate, connected through the walls with the mounting of the lamp, the officer rotated the bulb, changing the light through the entire spectrum of colors as he varied the wave length. The colors were brilliant, not at all like the results from the old method of shining a white light through a prism, for there was something vital about the colors emitted. And Addison marveled.

"I have been wondering why you have the control room in the center of the ship instead of out where you could see through windows."

"We place the control room there for the greatest protection against the enemy. But you'll understand that better when I show you our fighting methods."

"You were going to tell me about the two nations and the reason for the war," said Addison when he had watched the light for a time.

"Yes," said the officer, starting for the control room where he assisted Addison to a chair and pulled himself into another.

"You recall that I told you of how science is now in control of all governmental and industrial activities," the captain continued when they had strapped themselves into their chairs. "That is also true of education, of course. Through our educational system in the hands of scientists we are gradually bringing the people to a consciousness of world citizenship and have succeeded to the extent that all white nations have been consolidated into one indivisible and harmonious country. That is true also of the colored races. We were just getting to the place where we thought that we were civilized enough to enable us to unite the two nations and make a truly unified world with all military institutions delegated to the museum as relics of barbaric ages.

"But one man, in whom there has developed a colossal selfishness and a distorted ambition, has disrupted our cherished plans and thrown us into a frightful war. This man, Ghorski by name, was once a member of the experimental force working on the anti-nullifier which has been developed by the Occidental G-2 service and held as a secret. Ghorski, whose aura was good at the time of his admittance to the service, evidently changed, as may happen in rare instances. Taking advantage of the desire of the colored races for revenge after the suppressions and extortions by some of the white nations during the Steel Age, he has convinced them that, by their superior numbers, they can overrun the white race and subjugate them. He has a powerful personality and has succeeded in rousing the desire for world dominion among ambitious leaders despite the earnest opposition of the farseeing statesmen and writers of Orienta. It is very discouraging. Truly he is an evil genius such as one might expect to read about in ancient history.

"Our aim of education under the scientific regime is to direct the naturally aggressive tendency of the human being into channels of personal conquest. By this I mean that there are vast possibilities in the human mind which can be developed only through constant effort, and it is toward the unfolding of these latent powers and away from the false ambition for wealth and personal power that our psychologists are arranging the curriculums. We realize that this is the only means by which we can hope to realize our ideal of world peace."

The Age of Man

"I HAVE been wondering how it happens that I found a wilderness a short distance west of New York," Addison mused while he digested the information he had just received.

"That," said the officer, "is very simple. We make all of our food in laboratories and have little use for cultivation of large areas. We have allowed most of it to return to its natural state. We prohibit the killing of animals, having found that this law promotes our efforts toward peace. Our citizens live along the rivers and other scenic spots, leaving much of the unattractive land wild and elemental."

For some time they sat in silence. Addison glanced from time to time at a clock mounted above the control table and became interested. They had started on their dangerous mission at midnight and had traveled for an hour and a half, but the clock indicated the time as twelve:ten and now was stationary.

"I see your clock has stopped," he smiled at the captain. Surely he could find one little detail that did not

function perfectly.

The officer laughed. "No, that clock never stops. It is a local time clock, indicating the local time at any spot on the surface of the earth over which we happen to be flying at the moment. Its speed is controlled by a compass and an earth speed indicator, all corrections being automatic. We are now traveling toward the west at about a thousand miles per hour, so we are, as it were, keeping up with local time. Hence the hands are stationary. Should we change our course the compass and speed indicator would keep the clock on the proper local time. For instance, if we were now flying due south or due north along a meridian where the local time is the same, the clock would run at normal speed. On the other hand, were we flying due east at the speed we are now traveling westward, the clock would run at double speed. Again, should we increase our present speed in the course we are now holding the clock would run backwards. This is a great factor in determining our exact position during inclement weather."

Addison grinned sheepishly and looked at the clock with new respect.

Again there was silence and the visitor yawned despite his efforts at suppression.

"Here," said the commander, handing him a small green tablet. "This is a counter-irritant and antitoxin against the effects of fatigue poison. Although we sleep, realizing that sleep has other purposes than the mere resting and elimination of fatigue, we resort to these tablets during emergencies such as the present one."

Addison swallowed the pill and gradually the feeling of sleepiness and fatigue gave place to a sensation of freshness as though he had been asleep for several hours.

"Of course," the marveling visitor hesitated, "all of these wonders are commonplace to you, but you realize that they are intensely interesting to me, and I trust that you understand my position and sympathize with me while I ask numerous questions."

"Certainly," the captain laughed. "I have often thought that it might be curious to conduct a person of the Steel Age through our present civilization—and I find it interesting."

"By the way, you call the twentieth century the 'Steel Age.' What do you call this?"

"We term this the 'Age of Man' because man, through his scientific knowledge and his change of purpose has taken practically full control of the earth."

CHAPTER III

Addison Learns More

ADDISON rested back against the chair and turned his attention to the screens above the control table. They appeared similar to the one over which the captain had received his orders, but each was flooded with an even light. Suddenly he leaned forward with interest for he saw a shape nose into the field of light. Gradually it appeared—a flying craft similar to the one in which he rode, although he did not know that it was twice the size of the battle craft.

"What is that?" he indicated the image of the craft drawing away on the other edge of the screen.

"That is the Alaska-San Francisco Express crossing our course two miles below. That television screen is connected with a transmitter plate in the bottom of the ship. Our ship dispatcher routed with them twenty minutes ago and they chose the lower level. I see they are three seconds behind schedule."

"You use television a great deal. How does it function?"

"It is similar to the ones used during the Steel Age although vastly improved. Come and I'll show you the apparatus."

In a small room on the other side of the wall, against which the control table stood, the officer opened a compartment revealing the maze of connections and apparatus constituting the hidden part of the control mechanism. Much to Addison's amazement, the officer walked up the wall that he might better view the television apparatus which was too high for easy inspection from the floor. Although the sense of up and down was rather vague, it seemed to Addison that the floor was normally toward the earth's center of gravity, but when he stopped to think, he recalled that they were released from the dominance of gravity, and proceeded to follow the officer, a little apprehensively to be sure. With the idea of assisting himself up the wall with his hands after the manner of climbing a ladder, Addison ventured to follow the captain, and then straightened up perpendicular to the wall with an expression of utter amazement. Instead of a feeling that he was walking up the wall, it seemed to him that the entire room rotated ninety degrees, leaving the floor to form one wall of the room and the wall which he was climbing to take the place of the floor. He looked at the ceiling, now forming a wall, and wondered if—he tried it and surely, the room appeared to rotate until the ceiling was where the floor had been and the floor above him, constituting the ceiling! Mulling this phenomenon in his mind, Addison stepped back onto the wall, but which instantly seemed to become the floor, and stopped beside the captain where he stood looking down into the compartment containing the television apparatus. The captain, who had watched the visitor's experiment, laughed.

"Where there is no gravity as in this case," he explained, "we have no definite sense of up or down, but we, and our ancestors for centuries, have come to regard whatever we are standing upon as being below us or down, so we instinctively regard whatever our feet rest upon as being down, although now, during normal flight, the floor happens to be toward the earth. In fact, since the sensation of up and down is a matter of individual conception, this wall is actually down and the opposite wall is up while we are standing here. During battle maneuvers the ship often turns completely over although we have no sensation of the movement—there is no movement except to one who might happen to watch us from some external point. We who are accustomed to riding in this type of ship can feel changes through the centrifugal force which appears when the vessel rotates."

"I have observed that the laws of inertia and centrifugal force are still operative, despite the lack of gravity."

"Yes. These phenomena deal with mass rather than weight in motion or at rest. And here we have a case of mass without weight."

"I understand, although it startled me at first. Now, about this television"

"Since the general principle of this machine is identical with that of the old Steel Age apparatus for transmitting motion pictures, we might well review the old machine as a starting point. As you know, the light from the subject, for example a person's face, is di-

vided mechanically into a series of horizontal lines or rays of varying intensity. These rays act upon a light sensitive 'valve' which passes more or less electrical current as the intensity of light from various parts of the face opens or closes this valve. This varying current is then used, after being 'amplified,' to distort the carrier wave of a regular broadcast transmitter as though it were the varying current from a microphone.

"This distorted carrier wave is then picked up on the receiving antenna and used to operate the valves in an ordinary receiving set. When the distortion is 'amplified' sufficiently it is used, instead of operating a loud-speaker, to vary the intensity of the light from a special lamp. The varying light from this lamp is then cast in a thin line upon a screen and when the placing of these lines of light are exactly synchronized with the pick-up at the transmitter we have an image of the original.

"By way of analogy: If we should stretch pieces of thread tightly across a frame, so close together that the result appeared to be cloth, and then paint with dyes a picture on this cloth after which we should remove the threads and tie them end to end, we have accomplished the purpose of the pick-up. If we then blow the assembled length of thread through a tube to some distant point we have done the work of the transmitter. If, at the receiving point, they cut the lengths of thread apart and assemble them in a frame exactly as they originally were they have acted as a receiver—they have the picture.

"Because in the first attempts they used a motor-driven disc through which was drilled a spiral of holes, for lining the image at the transmitter and also for laying it upon the screen at the receiver, the image, because of the slowness and other limitations of the disc, was necessarily very small and coarse. And synchronizing the receiving disc with that of the transmitter was a source of constant trouble."

A Sumptuous Meal

"IN our present day apparatus," continued the officer, indicating a huge lens, "the image to be transmitted is brought to a flat field at the focal plane of this lens. This image, which is very bright, is divided or lined by these three tiny lenses—there is one for each primary color—and the threads of light focused upon these three special light-sensitive valves for transmission. These tiny lenses—pick-up lenses we call them—are connected by levers to highly responsive piezo crystals. These crystals, which, as you know, change shape in response to varying or alternating electrical currents, are agitated by crystal-controlled local oscillators, moving the pick-up lenses on their vertical axes through an arc that just covers the twenty-inch wide image field. The lenses are moved on a horizontal axis to cover the twenty-inch height of the field, being moved up and then down to cover the field twenty times per second by a carefully governed motor. Thus, by impressing upon the piezo crystals an alternating current with a frequency of 40,000 cycles per second, we have 4,000 lines per picture for each color or 12,000 lines for the picture in colors—600 lines per inch of screen. By a similar arrangement we lay the varying light on the screen at the receiving station. Since we have a large number of transmitters or 'plates' as we call them, set in various parts of the vessel's shell for viewing our surroundings, we use a large oscillator to control all of the piezo crystals for the televisions, lookouts and telescopes."

"Telescopes!"

"Yes. By using many of the tiny pick-up lenses at the transmitter and receiver making hundreds of lines to the inch and examining the receiving screen through a microscope we have a telescope."

Back in the control room the captain explained how the four screens above the control table could be switched over to any of the receiving plates about the hull, revealing the surroundings in the light of the infra-red searchlight.

"And here is a telescope," said the officer, indicating a screen set in a table over which was mounted an eye-piece in a swinging support. He closed one of several switches and a cone of light appeared on the screen.

"That is the glare of the infra-red searchlight directed toward the ocean."

Addison peered through the eye-piece and was startled to see how close the waves appeared.

They sat for a time in silence and then the commander picked up a 'phone and talked for a few moments. Presently a chef appeared bearing a tray of small cups which he served to all in the room. Addison looked into his cup of pills dubiously and turned his questioning eyes toward the captain.

"I told the chef what your colors are and he arranged a menu best suited to your needs. This is synthetic food from our laboratories," said the officer, swallowing one of the pellets.

Addison grinned several times during what the captain called a leisurely meal. How different from the real feast of the Steel Age! This struck him as being ludicrous and he chuckled inwardly as the dozen or so little pills slid down. "I wonder what these people would do if they were at an old-time table with its back nearly broken under the weight of food," he thought, struggling to hide his amusement from his gracious host.

They settled down for an "after dinner chat" as the captain put it, and Addison bubbled over with mirth. It was more of an "after pill chat."

"What is this mission we are on?" he asked finally.

"We are on our way to a spot in the Likiang mountains near the village of Likiang on the Yangtze river. One of our agents reports that there is unusual activity there and thinks that is the place where the Orientals are making their anti-nullifiers—machines that destroy the gravity nullifying power of any ship during the time they are directed at the ship. If that is true, and we are fairly certain that it is, you can imagine that the spot is protected by every means at their disposal and that we are going into the lions' den. But orders are orders."

CHAPTER IV

A Slight Annoyance

AGAIN the conversation lapsed and Addison watched the screens over the control table. Several ships crossed their field of vision, but every move seemed to be so carefully directed that he ceased to worry about the possibility of a collision at this frightful speed. The ship was silent, ominously silent, Addison thought, although the crew seemed to be at ease. It did not seem possible that this was a battle craft on a dangerous mission—it was more like a pleasure trip. Gradually a slight hum pushed its way through the stillness. The captain listened a moment and a look of annoyance crossed his face.

"Someone is careless," he said, pushing a button.

A man appeared, evidently a mechanic.

"What is that hum?" demanded the captain. "It is very annoying."

"The commutator on the lighting generator has a hard bar," the man explained. "I was going to turn it down this afternoon but the unexpected orders interrupted me."

"I see. Cut the load over on the other machine and take this one down to the machine shop for repairs. We'll take a chance on the one machine—it's better than enduring that annoying hum. And tell them to rush the job."

"Regardless of how carefully one trains a crew there are always evidences of negligence," the officer apologized to Addison when the man was gone. "I give them repeated orders to keep things in repair but they forget."

Again they were interrupted, this time by a man who entered and laid two films on the captain's desk. Addison noticed that they were photographs of blue, typewritten pages.

"More orders from Headquarters," said the commander, "if you will pardon me——"

"Another agent has confirmed the report of the first and they are now certain that our objective is the secret factory we are seeking," he informed Addison when he finished reading.

"How do you make photographs so quickly?" asked Addison, more interested in the process than the report. "I was going to ask you about it when I saw the one made in your office back at the airdrome."

"I had forgotten that you used to immerse your plates in chemical baths and otherwise go to a great deal of trouble and then secure only a black and white result," the captain nodded.

"We have two kinds of films, the black and the white. In either case the emulsion is in the presence of a powerful catalytic agent which makes the film 'exposing out.' I mean that when the film is exposed in the camera the picture appears instantly and requires no development. We use a gas which is a negative catalytic force and permanently stops all action. We release this gas inside the camera automatically after the exposure, so we can take the completed picture out immediately.

"The black films have a black emulsion which turns lighter upon exposure to light, the more intense the light the lighter the result. They are responsive to colors and reproduce them perfectly. Since we start with a black film and high-lights appear light, we obtain a positive. We print these on black paper or film to obtain copies in positive.

"The white films have a white emulsion that turns dark upon exposure to light, resulting in a negative. To obtain positive copies we print them on white paper or films."

"That is how we simplify our office and paper work," he added.

"By the way, where are we now?" asked Addison. "I should like to know how you calculate your position."

Captain Gauthier read the local time-clock and a chronometer and fed the data, together with the exact direction of their course into a computing machine from which he took the answer written on a little slip of paper similar to that used in an adding machine.

"40° 44′ 52″ N—161° 13′ 59.6″ WL," he read. "We are well over the Pacific Ocean and not very far from our objective."

For a time Addison sat watching the screens above the control table. He marveled at the number of ships that appeared out of the night to be swallowed again in the gulf of darkness. He became restless and asked if he might explore the ship.

"Certainly," said the captain, arising and assisting Addison to his precarious balance. "I believe that it would be easier if I carried you, since you are not accustomed to walking in this space of no gravity. No, it will not appear ludicrous to the crew for they all know about you and can appreciate your difficulties. In fact, they are wondering why I have not carried you before. If you will take off your magnetic shoes——"

Addison unbuckled his shoes a little dubiously and drew his foot from one of them.

"Be careful," the captain warned. "Hang onto me when you take your other foot out. If you should exert force against the floor you would overcome the inertia of your body's mass and continue upward until you bumped your head against the ceiling and continue bouncing between the floor and ceiling until the tissue and air friction stopped you or until somebody with shoes caught you."

Transmutation!

ADDISON clung to his host and gingerly removed his other foot, leaving the shoes fast to the floor. A feeling of utter helplessness came over him. He attempted to walk but could gain absolutely no traction for there was no force to set up friction between his feet and the floor. It occurred to him that he was like a wisp of smoke to be wafted hither and yon as suited the fancy of any air current that might stir.

"Hang onto my arm to steady yourself and we'll go," directed the officer.

The visitor grasped the captain's arm and held himself with some degree of success in an upright position, although there was no load on the commander's arm. When they started, however, Addison felt a slight pull until he was under way. Then the inertia was overcome and he floated along with no hindrance to his host. They were now in the narrow corridor which ran the length of the ship and Addison tried an experiment. Twisting on the supporting arm slightly, he maneuvered his body until it was at right angles to that of his new found friend and again experienced the phenomenon of the corridor revolving to accommodate his position. It seemed to him that the captain was now walking up the side of a tall shaft in which Addison hung from a precarious position. Two hundred fifty feet below was the bottom and the same distance above was the top! He gasped with dizziness and then laughed when the thought of the absence of gravity came to his rescue.

As they progressed on their tour of inspection, Addison was astonished at the great amount of machinery, some of great mass, and the number of the crew busy over the ship. He shuddered to think of the great splash should the gravity-nullifying equipment fail!

The visitor's curiosity was aroused when he noticed a continued duplication of small twin apparatus all about the shell of the craft. These were faced invariably by a lens of some five inches in diameter for one part of the equipment; while the companion machine extended what appeared to be a flat tube about eight inches wide and half an inch thick through the wall of the vessel. The tube passed through a ball which was set in a socket in the outer wall of the craft, permitting the tube to be moved about and still keep an air-tight joint.

"What are these?" he asked his guide.

"That machine upon which the lens in the shell is focused is an anti-nullifier. While rays from it are directed upon an enemy ship it paralyzes the nullifying forces of the vessel permitting gravity to crash it to the earth. This smaller machine is a molecule disrupter. It stops the activity of atoms and destroys their power of attracting one another and maintaining space between themselves. During a battle we cut huge slices out of the enemy craft until a vital spot is injured. Sometimes, if we catch an enemy ship unaware, we cut it completely in two before they can maneuver out of the danger. Come down to the repair shop and I'll show how it operates."

The captain "carried" Addison to the elevator in which they descended to the large, well-equipped machine shop.

"This," said the officer, indicating a box some three feet square and one foot deep, "is the insulator. You will notice that it is thinner than paper, yet it weighs, when on the surface of the earth, many tons. It is made of atoms which are not in motion and hence impervious to the action of the disrupter rays, and protects the floor, and whatever happens to be under the floor, from destruction."

Captain Gauthier went to a clamp on the wall from which he unfastened a small machine appearing to be an old-time electric drill of the small portable type. He plugged the cord in a receptacle protruding from the floor near the insulating box and then went to a scrap box from which he selected a piece of steel about a foot long and three inches square. While he was gone Addison, clinging to the box to keep from floating away, examined the contrivance. It was a hand tool with a flat tube similar to the one shown him just before but smaller. Addison noticed that the opening was about the thickness of paper and four inches wide.

"This ray," said the captain, laying the bar in the box, "is used for many purposes. It is of greatest value for cutting any kind of material and for making elements of which we are short. When the force arrests the atomic activity the cessation of atomic motion liberates a great quantity of heat, but when the ray is turned off the molecules build up again and use the heat. Since it is impossible to prevent some of the heat from escaping, the mass cools down until it has absorbed enough heat from its surroundings to furnish energy for the complete crystallization; whereupon the mass gradually warms up to room temperature."

The captain pointed the ray machine tube at the bar and pressed the trigger in the handle, sweeping the rays broadside the length of the bar with one quick motion and at once releasing the trigger. A blinding glare and intolerable heat emanated from the box. He dropped a tiny object into the terrible furnace and closed the lid.

"You see, the bar is no more," he continued to the awe-inspired visitor. "When the molecular structure is disrupted, the matter loses its identity and builds back up into most anything. To control this rebuilding, we drop some substance among the lifeless atoms around which they build, the formation identical with that of the 'seed' as we call it. In this case I dropped a chip of diamond into the presence of the dead matter so the atoms, as they absorb 'latent energy of molecular structure' will arrange themselves to form a diamond. Should I leave the lid open, vast quantities of air would result. In fact, all the air that we are breathing, now that we are so high that artificial air is necessary, is made in this way. In short it is our method of transmutation."

Over the Enemy

PRESENTLY the officer opened the lid and Addison was astonished to see that the once fiery mass was covered with frost. The officer lit a powerful torch and directed the intense flame into the box. The frost persisted for some time despite the applied heat but gradually melted, at which juncture he turned off the torch and picked up the resultant substance. Addison was astonished to see that it was a diamond crystal of more or less regular shape but with a flat bottom.

"Some of the atoms combined to form air, so the mass of this crystal is not so great as that of the steel bar," the captain explained. "We use this method in the laboratory for making quantities of otherwise rare elements, and for many fields of research. The lifeless atoms lie on the bottom of the box in the form of a fine, almost imperceptible dust, but as they become active they gather about the seed element and slowly, as they crystallize, push the seed upward and build beneath it. We create any element or compound, whether amorphous or crystalline, in this way. We have found a method whereby we render the atoms permanently dead and yet hold them together in any form we wish. It is of these lifeless atoms that this box is built. Another instance of the ray's use: the underground laboratory and hangar was excavated with this disrupter and the atoms of the rock and earth gradually turned into air and water.

"But we are nearing our objective and I must return to the control room."

Back in the control room Addison again donned his shoes and struggled over to the control table. He looked over the dials and was surprised to find that they were now sixty miles high and had changed their course and increased their speed. The local time-clock, however, was stationary.

"We started out on the wrong course to deceive any spies who might happen to see us," the captain explained. "We have increased our altitude to better conceal our movements and have swung toward our true objective, which is 99° 50′ 15½″ E. Long. and 27° 25′ 23″ N. Lat., a point about five hundred miles north of Mandalay. We have maintained a speed such as to arrive there at midnight. Should we sight an enemy ship, the entire crew will be warned by the ringing of a small bell, in which case strap yourself into a chair or hang onto something for support."

Addison was still thinking of the demonstration in the machine shop and shuddered when he tried to imagine what a terrible battle might ensue should they meet the enemy. To think of slicing one of these huge monsters into shavings! Now that he was close to the control table and could see the screens better he noticed that each was divided into two-inch squares by fine lines.

"Why the divisions?" he asked Lieutenant Evenrude, who still handled the keyboard.

"Firing cross-hairs," he answered. "When an enemy ship is imaged on any of the crosses he is covered by one of the atomic disrupters. The firing board is there," he indicated another table which Addison had thought was a duplicate control for the ship.

The captain was feeding some data into the calculating machine. After glancing at the answer he touched a button in response to which a man appeared and strapped himself into the chair before the firing

table. Addison watched this preparation apprehensively but those on the ship continued their routine duties as though nothing had happened. The captain sat at his desk constantly punching figures on the calculating machine and comparing the answers with positions on maps spread out before him. Addison grew nervous. They were evidently in enemy territory and all was in readiness for combat. He wondered how it would seem to find himself plunging toward the earth in half of this ship of steel.

"We are over the territory of the enemy now," said Evenrude without taking his eyes from the dials and screens. "If you will strap yourself into the chair between this and the firing table you can see what is going on."

The visitor strapped himself into the chair indicated and found it, like everything else in the craft, securely fastened. From this point of vantage he watched the two tables with their alert operators. He noticed a slightly different color on the screens and asked the cause.

"We have changed from infra-red to ultra-violet searchlights, or in fact, a band even shorter than ultra-violet," Evenrude said without turning his head. "We hope that the enemy is not equipped with this latest invention. If our supposition is correct, our lights will not show up on their screens and thus give us the advantage."

CHAPTER V
Battle!

AT first he saw nothing to indicate a ship, but presently he noticed a spot on the second screen that was slightly different in color than the rest.

"Number two, section twelve," Evenrude spoke to the gunner, and then to Addison, "That is the light of their infra-red searchlights. Probably a scout guarding the factory. I'll maneuver to get the craft in the screen and on the cross-hairs."

As he watched, Addison saw the light become brighter and more concentrated and felt a slight pressure this way and that as the ship was being maneuvered. Presently the enemy ship, appearing only half an inch long, entered the screen from the edge. It looked like a tiny fish with many searchlights reaching out and groping in the darkness. As Evenrude brought the ship closer, the image grew to an inch in length.

"Intersection twelve-two," Evenrude said quietly to the gunner. "Ready."

Addison watched in fascination. Evidently Evenrude had cut out the gyroscopic control for his fingers now danced over the keyboard as though he were typewriting a letter in haste. The image of the enemy danced and bobbed unsteadily in the little square but persistantly edged toward the intersection. Suddenly there was a blinding glare of white light where the ship had been. Addison blinked away the glaring after-image and looked again. The enemy now appeared nearer the center of the screen, while at the bottom of the picture he saw an object for an instant just as it left the field of vision. He looked closer at the ship and gasped. The nose of the monster had been cut completely off!

"Intersection eleven-eight," said Evenrude as though nothing had happened. "We have them on the defensive."

The stricken ship was now twisting and turning to throw off the aim of its pursuer and Evenrude found it difficult to get it into the intersection. For an instant, Addison saw it approach the intersection and the screen was enveloped in another flash of confusing light. When he could again see the enemy appeared untouched, but it suddenly changed course and a huge shaving from the top left the vessel and continued on the original course for a moment and then tipped downward and dropped faster and faster out of the field of view. Addison gasped. They had cut off a slice as though the monster were a carrot!

"Finish him on nine-thirteen intersection," said Evenrude in matter-of-fact tones.

Again the struggle to get the enemy into range began, a blinding flare that covered the entire screen made Addison's eyes swim, and all was over. When he again could see, he was astonished to behold two objects tumbling end over end toward the earth. The ship had been divided through the center from prow to stern!

Addison sat for a moment spellbound. A five hundred foot ship had been cut into pieces and hurled to earth with its crew of two hundred men, yet the routine in the control room of the victor had scarcely been disturbed. He looked about again and saw the captain calmly working over his maps and the stenographer voicing the happenings for the record in the ship's log.

A man entered, laid several sheets of red paper on the commander's desk and departed. The officer read one of the pages and then gave one to the stenographer, one to the television operator and one to each of the men at the control and gunner's tables.

"That was good work," he commented and praised his men. "We destroyed the enemy without much damage to ourselves."

Addison thought for a moment and then the significance of the officer's last remark dawned.

"'Without much damage to ourselves'. You don't mean that we were damaged?" he asked incredulously.

The captain smiled grimly. "We caught the enemy unaware but after the first attack they were active. They cut a slice from the bottom of our ship near the stern. We lost about two hundred tons of our mass, sixteen of the crew are gone and seven wounded. They cut off most of the machine shop and all of the crew's quarters. The head surgeon in the hospital says that all of the wounded will recover but it will require much care in two of the cases."

Addison was aghast! To think that sixteen of their own men had plunged to the ground in a shaving cut from the steel monster beneath his very feet, and yet he had known nothing of it until now! He recovered from the horror and shock of this news and was thoughtful for several minutes.

"Why don't you insulate your ships with the material used in the construction of the box in the machine shop — that 'lifeless atomic insulation' — to guard against the atomic disrupting apparatus of the enemy?" he asked the captain.

"It is only recently that we have discovered the means of holding the dead atoms together, but our new ships, which are now under construction, are so insulated. But there were none yet in commission when we left."

The captain returned to his desk while Evenrude put the ship on her course again.

"We are almost over the valley we are seeking," said the lieutenant. "I imagine that they know of our coming and we may see some real action soon. They may send a fleet of ships after us or they may use

anti-nullifiers from the ground. In either case we expect a difficult time."

"What will you do to protect this ship?" Addison asked. It seemed hopeless to continue on the mission now that he had seen the frightful effect of the weapons, and they were now reasonably sure that the enemy expected them.

"We'll turn on all of our disrupting guns and then spin on our longitudinal axis. That will cut deep gashes in the ground for miles around and possibly destroy their defensive equipment. Of course, it is a desperate chance that we are taking, but the world is in a desperate condition at present so we feel that we are justified."

Desperate Moments

ADDISON turned this idea over in his mind but was interrupted by a flash of red light from the instrument board on the wall. Lieutenant Evenrude cut out the gyroscopic control.

The captain came over and stood beside Addison's chair to watch the instruments and give orders.

"Close the master switch," he said calmly to the gunner. "We are directly over the objective," and to Evenrude, "Spin!"

Addison clung to the chair in desperation, forgetting that he was strapped in. He felt his body thrown this way and that until his senses reeled. By an effort of his will he controlled himself and looked at the calm officers at the keys and then up at the screens. First one and then another, in rapid rotation, flashed into brilliant light!

He noticed the red light. Sometimes it was gleaming brightly and again it went dark, only to flash up again, each change being accompanied by a jar of the ship.

"What is the red light?" he gasped.

"Anti-nullifier indicator," said the captain. "In other words, when the red light is on our nullifiers are paralyzed and we are falling."

"Change the course to three points east of north," said the commander. "We've gone beyond our objective."

Addison watched the dials on the wall and was horrified to see the altimeter sink rapidly while the red light was on but mount when it was extinguished. But they were losing altitude continually; nearer to the earth with each flash of red!

"I had no idea that they were so well protected," said the captain with a frown. "If we don't destroy their antinullifiers soon we're lost."

As they drew nearer to the earth the blinding glare that flashed successively over the screens became so bright that Addison was forced to turn his swimming eyes away. He watched the instruments, and the wild spinning of inclinometers, levels, compasses, and others he knew nothing of, gave him an idea of the wild contortions the ship was going through. But he could feel it, too, as his body was thrown this way and that. One of the advantages of eating pills of synthetic food rather than the old time bulky meals, occurred to him now.

They were only two miles above the earth's surface and Addison had tensed himself for the frightful shock he felt must surely come, when the red flashes from the instrument board became more intermittent and finally ceased altogether. The commander gave an order and the flashes on the screens ceased, the instruments steadied and all came to rest.

"Put her in neutral and we'll hold this position until morning," said the Captain. "Apparently we have destroyed their anti-nullifiers since they have gradually ceased to function."

Addison leaned back to gather together his senses. As time passed and he listened to the silence he dozed, nor did he realize that he had slept until the captain spoke to him.

"Do you wish to go outside?"

Addison started and looked questioningly up at the grim smile on the commander's face.

"Do you wish to go outside?" he repeated.

"Oh, yes, by all means."

The sun was just peering up over the mountains to the east when Allison stepped from the ladder to view the landscape. And what a landscape!

As though some giant had gone over the mountains and valleys with a huge plow, cutting bottomless furrows promiscuously in every direction as far as the eye could reach, the territory was a riot of frightful destruction!

Addison gasped in horror. He stared at the captain with blank amazement.

"This treatment is meant to be a trifle disconcerting to the enemy," the officer smiled. "It is only the second time in history that any battle-ship has torn up the ground in this fashion. In fact, we are not permitted to do it except under exceptional circumstances. But go over and look into one of the furrows."

Although the captain knew what to expect, the other members of the crew had never seen such havoc and crowded along the crevice into which Addison was staring. They could not see the bottom of the cut, but were intensely interested in the sides. When the atoms had taken up energy to again form molecules, they had crystallized into fantastic shapes of metal and quartz that glistened and sparkled in the sunlight as though striving to atone for the frightful wounds. They explored farther down the canyon, jumping over the two foot gashes. They found the bodies of several unfortunate Orientals who had been caught in the flaming destruction, and around a turn, two fighting vessels similar to their own. Addison traced the furrows down the mountain side, through the ships and up the other side of the canyon—nothing escaped. The ships had been cut this way and that into many sections, the edges of the incisions, as always, fringed with glittering crystals.

An Old-Fashioned Weapon

SUDDENLY the captain stopped. Beyond the ships, the canyon floor widened to about a thousand feet and here, as though the fateful plow had struck a huge flat rock and slid harmlessly over. The ground was untouched.

"All hands aboard the ship," he ordered quietly. "Battle stations."

Addison was about to inquire as to the cause of this sudden order when another quiet voice broke the grim stillness.

"All hands in the air."

The hands of the Occidental crew instantly reached upward and the visitor turned to see who had taken charge of the situation. He turned cold and froze in his tracks! With some twenty-five men at his back, each armed as was he, stood a man with a small molecule disrupter leveled at the exploring party!

"Search them," ordered the stranger.

While the leader kept the first group covered with

the deadly disrupter the prisoners filed, one at a time, between guards who quickly searched them and passed them to a new and growing group. It reminded Addison of the fateful trickle of sand through the neck of an hourglass. Several of the officers had carried small pocket disrupters and were quickly disarmed by the silent guards. Addison underwent the search with apprehension. The guards took from his pocket a heavy black object and examined it curiously but returned it to him—he carried no disrupter. He edged over to Captain Gauthier and bent close to him.

"Be ready when I make a move," he breathed.

The captives had all been searched and the leader of the enemy walked up to Captain Gauthier.

"We expected a move of this kind, so insulated our shops and hangars. You certainly changed the map, but we captured you and your ship. Thanks for the ship," he said with a quiet smile. "We figured that if we turned off our anti-nullifiers one at a time you would think that you had destroyed them—and the trap worked."

"You win for the time being, Ghorski," the captain said slowly. "What are you going to do with us?"

"We'll question your men and then make all of you immortal. We haven't decided what to transmute you into but have been thinking of a huge gold nugget for the museum at Singapore."

Addison, who had looked upon Ghorski as a rather pleasant person, shuddered, and any hesitancy he had felt gave way to desperation. Quickly he drew the heavy black object that the searchers had scorned and pointed it at the traitor's right shoulder. There was a flash of fire and a report that blasted the stillness to atoms. Mountain peaks barked savagely at one another, while the two groups of quiet-loving men stood rooted to the ground in horror that their sensitive ears should be thus tortured. A queer look of mingled pain and astonishment spread over Ghorski's face and he clutched at his shoulder. His right hand hung limp and the disrupter slid from his numb fingers. Captain Gauthier, startled as he was, recovered himself and seized the disrupter from the traitor's stiffened hand. It was a tense moment and Gauthier was equal to it.

Addison turned his head away, and well that he did. A blinding flash that left the sunlight pale and sickly by comparison lit the canyon for an instant. A wave of frightful heat like the breath of an angry furnace rushed by, scorching his clothes and singeing his hair. Slowly and apprehensively he turned and there, not twenty-six men but fifty-two pieces of men lay in grotesque huddles on the ground, frozen solid.

"Alright," said the captain quietly, feeling his numb, outraged ears, "we'll go down and destroy their laboratory and hangars. I am sure that the Orientals will be ready to listen to reason now. But how did you make that frightful racket?"

"I shot with a Colt 45 automatic," said Allison simply, handing the heavy weapon to the captain who examined it curiously.

"Seems to me that I saw one of these in the Museum of Antiquity at Chicago but I didn't pay much attention to it. How did you happen to bring such an old fashioned contrivance along?"

"I had no idea of what conditions I might encounter on this plane so brought it along as a precautionary measure," Addison smiled, sliding the gun back into his pocket.

THE END

NEXT MONTH

BEGINNING with our September issue, we are inaugurating a new department in this magazine entitled:

"AVIATION FORUM"

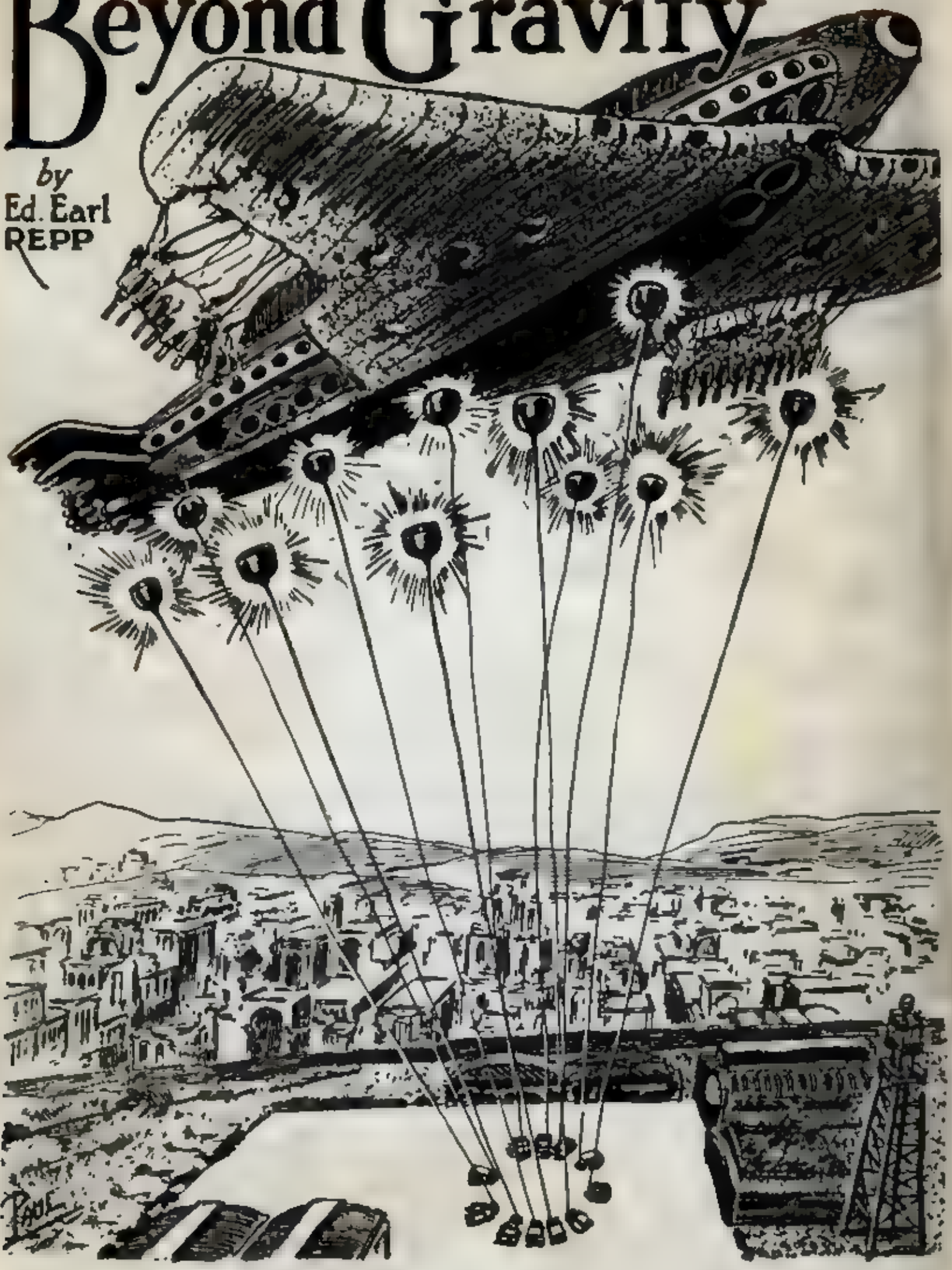
In this department, we shall endeavor to answer any and all questions, not only of technical, but general aviation interest. Ask us any questions about aeronautics or aviation that comes to your mind. Those of interest to our readers will be published in the "Aviation Forum" department every month.

Our staff of aviation experts will give authoritative answers to your questions. There is no charge for this service.

Address all questions to "Aviation Forum," c/o Air Wonder Stories, 96-98 Park Place, New York.

Beyond Gravity

by
Ed. Earl
REPP



Gradually the battered *Annihilator* dropped earthward, her huge body overshadowing the airdrome. The magnetic drums held tightly to her gleaming body as the winches, groaning, rewound the cables.

CHAPTER I
The Leviathan

IT was an exceptionally quiet afternoon in Denver, the sky was devoid of the usual swarms of private aircraft. Ordinarily these should be many afoot, transporting their owners, with bird-like grace and leisure, along their varied pleasure and business pursuits. But the absence of these swarms on this day was perplexing, at least to one who had been accustomed to watching the various types of craft darting hither and yon along the ordinary airlanes above Denver, the hub city of western aero travel.

On an ordinary day one would have seen a constant stream of trim-looking, graceful and swift craft of various types and proportions, forming a perfect cross as they sped along the governmental lanes to and from Los Angeles, Chicago and New York; or El Paso, Vancouver and Alaska.

Intently I scanned the air. I was standing at the time at my huge, specially built-in exposure on the eastern side of my hotel-apartment on the hundred and ninetieth floor of the new Orville Wright Aero Hotel and Terminal Building which had recently been erected in the memory of the early pioneer of aviation. It was my favorite spot, and I leaned lazily against the massive frame of the big window, while studying the oddly vacant sky in front of me. For miles and miles I could see over the rolling western plains. Far to the south I could see the white streak of the Great American Desert looming oddly against a background of solid green. Occasionally I could catch a glimpse of the Colorado, a silver thread, winding its way snake-like through a maze of mountains; and when the atmosphere was just right it was possible for me to see even the great inland sea formed by the reconstructed Boulder Dam.

Here and there were speeding craft which, by looking at my radio-controlled chronometer timepiece, I accepted as being the usual hourly planes bringing in the mail from outlying points off the lanes of ordinary travel. Needless for me to say, as early as 1950, the government had laid out a system of airways transversing the entire United States with direct lanes for air travel. This afforded the necessary protection to the countless planes that ordinarily should be soaring over Denver, and allowed them to avoid the treacherous atmospheres that made air travel over certain portions of the Rocky Mountains indeed dangerous. Only government planes were allowed to stray off the established lanes — the private craft being forced to observe the law rigidly. Moreover, privately owned planes were forbidden to rise above the 25,000 foot level, thus keeping them well below the upper levels of commercial travel. Planes violating the legislation, put into effect in 1975, were immediately

ED EARL REPP

brought to earth, their screws made dead and cylinders locked by a powerful system of radio-active forces broadcasted by the government observation and policing stations. The culprit piloting the offending craft was dealt with immediately and severely in accordance with the statutory provisions for such offenders. There was no place in the air for those who for sheer love of adventure endangered the serene souls traveling in the majestic air-liners in the higher levels.

Presently my eyes roved to the east. Through the pale haze, that hangs like a ghostly curtain from the sky, over the country some miles east of Denver, I caught sight of a tiny speck that grew gradually in size until it loomed majestically and awesomely in the air like some terrestrial spectre. I was surprised to see that it was a gigantic air-cruiser and traveling at a terrific speed in a lane high above the usual level for ordinary commercial flight.

I watched the advancing leviathan of the air with growing interest as it sped like an arrow straight toward the hotel. Even at its distance of more than a score of miles I could see that its geometrically shaped nose was colored with the traditional insignia of the United States Air Forces. The craft was the first of its kind to have ever cruised in the direction of Denver and suddenly I remembered having seen it under construction through the screen of my super-sensitive 42 power television receiver. I was awed at the tremendous speed of the leviathan and intently watched its advance toward the great landing atop the Wright Aero Hotel. In a few seconds it shot to within three miles of my building and allowed me a chance to take in the graceful stream lines, rear aileron laterals and a rigid stabilizing fin rising from the rounded top surface of the craft's long, narrow cylindrical body. Unlike other modern craft, the leviathan displayed not a single screw! She seemed totally absent of propellers and I studied her under-surface for a glimpse of her propulsion principles.

As the craft came closer, I noticed a dozen or more streaks of pale blue fire trailing. With a buzzing sound that grew to a roar as the ship neared the landing, the streaks of fire slowly disappeared in a wraith of pale vapor. Suddenly the nose of the craft dipped downward, and just as

WE take great pleasure in introducing to our readers, Mr. Ed Earl Repp, our new author, whom we consider one of the most promising science-aviation fiction writers of the day.

In his initial story, the author introduces so many new instrumentalities of science as applied to aviation, that it fairly takes your breath away. Stories of aviation of the future are always intensely interesting, because they bring to our vision in the most thrilling way, pictures of strange ways of conquering distance. And if the story is as good as the present one, it makes not only interesting reading but gives one a prophetic insight as well.

While some of the things mentioned in this story may sound improbable to-day, there is no denying that they may become commonplace long before the period mentioned in this story will have been reached.

suddenly, the blue streaks vomiting from underneath her rear aileron laterals and elevating aerofoils, vanished. From out of horizontal chambers constructed along the sides of the craft's body just below a long line of cabin windows, there appeared gradually, two wide stabilizing aerofoils, spreading like the wings of an eagle, that floated the ship to a graceful landing. I expected to feel a tremendous quake surge through the building as the craft landed, but there was not the slightest quiver.

A Pleasant Meeting

INTERESTED in this new type of ship, I dashed out of my apartment and in a minute I was standing on the landing beside it. Over the nose of the ship I noticed for the first time the controlling compartment enclosed entirely behind thick, transparently rigid asbestos gelatin, the new form of glass that I had read could withstand the terrific heat caused by the great friction through the atmosphere. This great craft I thought certainly needed that protection! Hadn't it come into view and landed from a distance of probably more than twenty-five miles in the space of a minute? I doubted, as I scanned the ship admiringly, that twenty-five miles per minute was all this great air-cruiser was capable of doing!

As I strode along the ship toward the narrowing tail, my nostrils dilated under a force of some strange gaseous substance. A thin wisp of vapor seemed to be issuing from a spot underneath the aileron laterals. Fourteen tubes in all protruded from under the laterals——in a diamond shape formation. They were thick and powerful-looking and glowed with a peculiar blue luminosity that, even at the distance where I stood, seemed to burn my skin sharply. Truly, there were the vents from which issued the propulsion explosions! Internal combustion engines with outlet manifolds extending to the tubes under the laterals, with the centrifugal force of a rocket, gave this great ship its astounding speed.

True, the combustion of gaseous substances to cause the "rocket" propulsion force was not entirely new. It had been evolved in 1927 by a German, and utilized for the first time to propel an old time racing car. I remembered seeing the historic machine in the International Museum for Mechanical and Scientific Expansion over in New York. But what I saw now was truly a great piece of work, the result, no doubt of years and years of steady research and experimentation. What really awed me was the absolute secrecy that the government used in preparing this leviathan of the air for service. Now, it was doubtlessly upon its maiden voyage or trial cruise out of the big station at Kitty Hawk. Now the world was going to really learn something about modern aviation! In comparison with this tremendous craft, our commercial ships seemed like mere pigmies in both longitudinal surface and velocity. This craft, I speculated, would be capable of outdistancing with little effort, even the fastest of our tiny sport model racing planes of the humming bird principle.

I was studying intently the under-carriage of the great ship, lost in absorbing the construction of the unusual claw-like grips, which, tightly clamped, apparently by suction, to the floor of the landing, held the ship firmly. Suddenly I felt a hand touch my shoulder. I jumped nervously.

"Come on, Mr. Holdon and I'll show you something worth looking at!" I heard a laughing voice. I was surprised at the mention of my name for I had kept close to my apartment and my amusing television since I had left New York for a summer vacation in Denver. I turned and found myself staring into the bright young face of Lieutenant Bob Allison, son of my life-long friend and benefactor, Senator Allison.

"Bob!" I cried happily, for I was very glad to see the smiling features before me. "What——how on earth—what are you doing here? Your dad talked with me only this morning and he told me that you were stationed at Kitty Hawk. Of course he must have been mistaken for you couldn't be two places at once. Tell me about yourself, Bob. What do you think of this contraption of the United States Air Forces? Quite a ship, eh?"

"You bet, Mr. Holdon!" he replied eagerly. "She's a real boat. Dad was right too, for I am stationed at Kitty Hawk. I left there just exactly an hour and twenty minutes ago and here I am at Denver."

"You—y-o-u what?" I stared at him incredulously.

"Why sure, Mr. Holdon, I left Kitty Hawk at 2:20 this afternoon——in this ship, the U. S. A. F. *Annihilator*, and it is just 3:45 now. Surprised, aren't you? You ought to be, riding around in old tubs that can't do better than 550 miles per hour. Why, Mr. Holdon, this craft here can do sixteen hundred miles per hour without effort. Imagine Colonel Lindbergh doing the Atlantic in 36 hours in 1926! I don't envy him that flight after a cruise in the *Annihilator!*"

I laughed softly at his references to dear old Lindy who had performed such a wonderful feat in the old days. But of a certainty, our heroes of to-day were gaining new glories almost daily. Take Lieutenant-Colonel Brockenridge, for instance. He succeeded several years ago in an attempt to fly around the entire globe without a single stop and when he reached the starting point his plane was functioning with such perfectness that he continued around a second time. That was a wonderful feat for the advancement of aviation but of course it did not hold the dangers that confronted Lindbergh, considering the development of aircraft since his historical flight in "The Spirit of St. Louis."

"My lord, Bob, you young bloods will get yourselves killed yet!" I groaned, holding his steady hand in my nervous grip. "Why all the secrecy about this wonderful *Annihilator?* It will revolutionize all aviation!"

"Well, you see, Mr. Holdon, the government does not want to be caught again unprepared as it was fifty years ago when the Eastern Powers swooped down on us. With this ship and five thousand others like it we have the supremacy of the air at last. By that supremacy we can force the entire world to maintain perfect harmony in peace and no more will they attempt to add rich old Uncle Samuel to their long lists of conquests. To gain superiority over *anything* absolute secrecy must be practiced. Of course, the government gave the public an insight into the construction of the craft, but so far as mechanical principles are concerned, only a few have been thus far permitted to know them. I don't think it will revolutionize the aviation industry to any great extent, in view of the fact that the government will not permit ships of this type to be constructed for public use. At least not for the present."

Something About Joan

"AND you came here in the *Annihilator*, Bob? I'll bet your father will have a fit at you taking such chances." I said.

"No, Mr. Holdon, he won't," the young man smiled. "Confidentially, he is responsible for me being one of its commanding pilots. He saw to it that I received a commission on board the *Annihilator*. But, believe me, I had to work for it!"

"Certainly you did, Bob! I know you well. You are like your father in many ways. He wouldn't accept anything unless he was absolutely certain that he had earned it. Robert, your father is one of the finest men in this country and you should be proud of him!"

"Thank you, Mr. Holdon. I'm sure that the feeling is mutual all around. Naturally I'm proud of dad. He's the best fellow, and the finest friend I've ever had. But speaking of friends, Mr. Holdon, where's Joan?"

"Joan? Oh, you mean that death-defying young sprout of mine? Well, Robert, my boy, that girl is going to mean the end of me yet! I can't keep her out of the air. She left this morning for Los Angeles, to go bathing. Said she'd be back about mid-afternoon. I'll have to tame that young lady, Bob!"

Young Allison laughed delightedly, his even white teeth gleaming softly. His trim, slightly upcurled mustache that was the fad among the smarter young officers of the day, did not add much to his handsome face. Bob Allison would have been handsome even under a six months' growth of whiskers.

"Tame her, Mr. Holdon? Do you think you could do it after all these years? She always was as wild as any of the youngsters in our set. You know I haven't seen Joan in ten years? She was at school in Warsaw when I entered the Government Academy of Aviation at New Orleans. Does she still have that funny little nose that the youngsters used to kid her about?"

"That's right, Bob, it must be ten years since you saw her, at that! Joan was an odd youngster and that upturned nose was the main source of her worry. I'll bet she licked all the kids in Washington over it, but wait until you see Joan as she is now. Why Bob she's as ugly as a greasy accelerator!"

I squinted at the Lieutenant to see how he accepted my teasing word-picture of my untameable daughter. I expected to see his face cloud but he continued smiling pleasantly.

"Joan couldn't be as ugly as all that, Mr. Holdon. I might say frankly that I believe you're having some fun at my expense. Go right ahead and have it because it does not alter my brain-picture of Joan. I've always admired her in spite of the fact that she used to think that I was put on this earth for the sole purpose of making fun of her nose."

I whistled softly.

"Don't tell me you're in love with a girl you haven't seen in ten years, Bob!"

His face colored under the taunt. He stared down at his neat-fitting boots.

"Wel-l-l, Mr. Holdon, I don't just know whether I am or not. I've always admired Joan. I thought her little nose was cute."

"No, my boy, Joan no longer has that nose. Nature took its course and developed a nose that would cause the Statue of Liberty to hang her head in shame. Joan is as good to look at as she is wild and fearless, Bob. It'll take a good man——a damn good man to tame that youngster! If you can do it, you have my blessing!"

Bob's face brightened perceptibly and his steel blue eyes snapped eagerly. He gave my hand an appreciative squeeze and grinned bashfully. I scanned the western skies searching for a glimpse of Joan's trim little aerospeedster with its brilliant red and orchid color-scheme. The air was queerly vacant except for commercial planes.

"Darn funny, Bob," I remarked uneasily, "that on a day like this there are so few planes in the air! What do you think is keeping the swarms in their hangars?"

"Why, Mr. Holdon, didn't you get the government bulletin over the televisoo requesting pleasure ships to remain out of the air to-day?"

"No, I didn't!" I said, surprised.

"Well that's the reason why the sky seems so deserted. The government broadcast a bulletin this morning requesting that all air travel with the exception of necessary flight, be suspended for twelve hours. That was a protective measure to give the *Annihilator* right of way from Kitty Hawk to points west."

"So that's it, eh? And that Joan had to take-off in the face of a government order prohibiting it! I must have fell asleep after she left this morning, Bob, and failed to hear the gong on my television receiver. If I had known, you bet Joan would not have hopped off."

Joan Arrives

"OH well, you needn't be alarmed over that. She's in no danger of crossing our combustion exhausts because we are not going farther west than Denver. When we take to the air this evening we cut a straight line across the Divide for New York to map a new route for official aircraft."

"I'm a little bit worried about Joan—in fact, Bob, I'm always worried about the little rapscallion! Here it is four o'clock! She should have been back by now."

"Leave her alone and she'll come home, dragging her little plane behind her!" laughed Bob. "I'd like to see her before we take off, though. We hop off at seven."

"I suppose Joan would like to have a look at the *Annihilator*, Bob," I teased him. "I'm not so sure about its officers. She might not care to see any of them, especially one who used to tease her about her nose."

"You don't think then that she'd be glad to see me, Mr. Holdon? Then you and I will look over the *Annihilator*."

"Oh come on, my boy, don't take it so hard," I said, "She'll be tickled to death to see you! We'll wait for her. I know she'll enjoy it. Don't worry about me. I'll trail along with my eyes closed. Let's go down to my apartment, perhaps I can find out where Joan is at this time. She has a small aero-television system on her plane. By the way, what brought the *Annihilator* to Denver when it could have flown El Paso or some other city?"

Lieutenant Bob Allison blushed profusely and turned his head skyward.

"Well now, Mr. Holdon, I really don't like to say. I'm not the ship's commander you know. I'm just a pilot. But if you really want to know, I'm not too bashful to tell you confidentially. Dad thought it would be a good idea if I came out here to Denver to renew old acquaintances. Denver was as good as any other destination to the War Department. Dad arranged that too. And I wanted to see Joan. There you have it all in a grease-cup. The *Annihilator* cruised out here for my personal benefit, but nobody knows it."

"Well I'll be damned!" I expostulated, "You young bloods seem to have control of everything. Why in my day———"

Suddenly a blood-curdling shriek sounded overhead like the wail of a tropical tornado. I looked up, wondering what sort of a craft was demanding the right of way to land on top of the Wright Aero Hotel. Swooping in graceful circles at a terrific speed, Joan's trim little aerospeedster, with its tiny, transparent aerofoils, whined above with muffled twin-screws in preparation for a drop landing. The tiny ship, glistened under the glare of the sun, zoomed upward in three daring half-cockle turns to slow its speed.

We watched it breathlessly.

"That's Joan, my boy!" I said proudly, nudging Bob. "She's certainly in a hair-raising mood today."

"She can handle that mosquito alright, Mr Holdon," Bob Allison said, admiringly. "She's got plenty of landing space. She must be getting a bird's-eye view of the *Annihilator*. Here she comes!"

Instantly Joan's tiny plane stopped dead above the landing, the twin-screws on each of its two small, gyroscopic motors, rigid and still. Over the enclosed cockpit rose a series of small, whirling blades that held the aerospeedster in the air with the ease of a humming bird. Gradually the whirling heliocoptic screw slowed down as the speedster settled toward the landing. It came to a gentle standstill between the leviathan *Annihilator* and a huge trans-continental air-liner with a few scant inches to spare on either side of her tiny ship. She looked like a tick nestling under the belly of a wolf-hound. Immediately she stepped out of the cockpit, a vari-hued dressing robe around her slender form and a tight-fitting helmet covering her head, and there arose a great applause from the crowds of officers and civilians grouped around the *Annihilator*.

True to the traditions of eternal femininity, Joan accepted the plaudits joyously as though she expected men to slap their hands together in appreciation of her flying ability if not the exciting warmth of her beauty. As she walked blithely toward the elevators which would carry us down to our apartment floor, she waved at an occasional acquaintance or spoke to a casual friend. She seemed to show little interest in the huge leviathan of the air although I could see, as she neared us, that she was bubbling over with excitement.

"Joan!" I called, with my usual severity that expressed more of a habit than actual wrath. "What do you mean by stunting like that over the airdrome? Don't you know that I have to pay your fines everytime you get caught performing like an idiot? Where on earth did you get that crazy siren? Come here, dear!"

"Come along, daddy, be a good sport. Gosh! The siren? You mean my new Right-of-Way whistle! I bought it over in Los Angeles at the Sky-Hi. They have the nicest things there, daddy! I just had to stop off for a few minutes and I couldn't look without buying a new whistle."

Bob Allison stood aside as I remonstrated with Joan. He was smiling happily. I wondered if Joan would recognize him after a lapse of ten years. She grasped the lapel of my jacket and shook it playfully.

"Father," she whispered, "who is that handsome young Lieutenant standing over there? His face seems familiar. Why the idea! He's even flirting with me! How brazen!"

She stamped a daintily-clad foot, still encased in her narrow, orange and red bathing slippers.

"Why Joan, dear!" I said, feigning an expression of astonishment. "Don't you know that young man? I'm ashamed of you, Joan. Think hard, and see if you can't remember the young man you used to think was put into this world for the sole purpose of teasing you."

CHAPTER II
Making Plans

I WINKED at Bob, who maintained his distance, taking pleasant amusement out of the situation. He smiled broadly behind a gloved hand that hid most of his face.

"You don't mean to tell me that he is that little shrimp of a Robert Allison, do you, daddy?" she asked, excitedly. "Why the very idea! He still laughs at me, too! I hate him!"

"It's Bob Allison and no other, darling," I said, patting her gently. "He piloted the *Annhilator* here from Kitty Hawk just to see you, Joan. He's going to be our guest until the ship departs at seven. Come here, Bob!"

In several swift strides Bob reached us, hat in hand, his dark brown hair ruffled by a slight breeze blowing in from the west.

"Joan," I said, turning her head around after she had deliberately swung her upturned face toward the *Annihilator*. "This is Robert Allison, son of my very dear friend, Senator Allison. You remember Bob from your childhood days back in Washington, don't you? He thinks your nose is very pretty now, don't you Bob, my boy?"

"I think it is adorable, Mr. Holdon," he replied, enthusiastically. "In fact I think it is the prettiest nose I ever saw! Honest, Joan! If you'll give me a chance to appraise it I'll———"

"You'll laugh at it, Bob Allison," she interrupted impudently. "I'll never forgive you for teasing me about *my funny little nose!*"

"Ah, Joan," said Bob, appealingly. "That was only kid play. How could you hold any bad-feelings toward me for something I did when I wasn't responsible? You seem to forget that you always called me 'that little shrimp of a Bob Allison', don't you?"

The sides of Joan's pretty, clearly-arched lips twitched in an effort to suppress a laugh that was struggling to find an outlet. I noticed it but Bob could hardly have seen the slight movements, for he continued, ill at ease over her impudent attitude toward him. I felt that Joan was enjoying the situation at his expense. She is a chip off the old block when it comes to teasing people who appealed to her.

"Just think, Joan," he said, softly. "It's been ten years since I laughed at your nose. I've never forgotten and I am here really to ah-h-ah er-er apologize for making fun of it. Honest, Joan!"

"Well do you expect me to stand out here freezing to death while you stumble all over yourself trying to apologize?" she said. "I never accept apologies in public anyhow, Mr. Allison. You may accompany us to the apartment."

I shot a wink at the young man as we entered the radio-controlled elevator. His discomfiture under the stinging lash of Joan's ready words was amusing indeed, and I understood perfectly that Joan was merely playing with him. It was her way of enjoying the companionship of her most cherished friends, and of course Bob could not know this. She was not

unlike any other woman—she made a man feel as miserable as she possibly could; then would bring him back to normalcy with soft words and sympathy.

Following its usual sudden drop, the elevator's automatic doors swung open and we found ourselves in the broad, spacious hall of our apartment floor. A few seconds walk carried us to my apartment. During the rapid drop in the elevator Joan maintained a stoic attitude toward Bob. He seemed very uneasy because apparently Joan still resented the taunts that he had playfully heaped upon her during their younger days together. I was enjoying it hugely, although I felt that poor Bob should not be made to suffer just to satisfy Joan's coquettishness.

"You've a nice comfy apartment here, Mr. Holdon," Bob volunteered as he seated himself in the spacious divan in the living room.

Without a word Joan made haste toward her own chamber. I did not doubt but that she was chilled coming into the open air out of the warm control cabin of her little plane.

"Yes, Bob," I said, handing him my humidor of favorite cigars. "Joan and I like it here. I'm content to remain here for the rest of my days if I can keep that female upstart out of mischief."

"I don't seem a very welcome guest to her, Mr. Holdon," he said disconsolately.

I could not suppress a laugh.

"Don't pay any attention to her attitude, my boy! She is just trying to tease you—trying to have some fun in her own way."

"Oh! So that's it?" Bob said, brightening, "She's still the same old Joan."

"That's right, Bob!" I said, grinning. "She was laughing at you up on the landing!"

He chuckled softly and his face lightened as he settled himself into a more comfortable position.

"I'm a dud with women, Mr. Holdon," he said smiling. "But I—I———"

"But you're one of the best pilots in the United States Air Forces, is that it?" I interrupted.

"Nothing like that," he smiled modestly. "There's a lot of pilot-navigators better than I, and I don't hold any medals. I meant to say that I have not had much experience with the fair sex. I've been too busy trying to get ahead. Yet I always cherished a secret feeling for Joan that killed any desire to mingle with others."

"That's heroic, my boy," I said with admiration. "I've watched you all these years, through my own and your father's eyes. I'm convinced that there's not a cleaner or more upstanding young man in this country than you, Bob."

"It's nice of you to say that. I appreciate it sincerely," he smiled.

"Oh I have reason enough for saying that," I said, seriously. "I've always figured that someday you and Joan would———"

"What's that you say, daddy?"

A Warning

AT the sound of Joan's musical voice I turned. Bob arose politely, delight written plainly on his tanned features. Joan had silently entered the living room and was smiling radiantly.

"Wh-y-y Joan," Bob stammered, his eyes sparkling happily.

"Don't stammer like that, Mr. Allison," she said. "Haven't you ever seen a woman before?"

"Listen, little girl," I said, seriously, "Let Bob alone! He's leaving with the *Annihilator* at seven and we just have time for a quiet dinner and an inspection tour of the ship before he departs."

"I'm sorry, Robert," she said, apologetically. "You don't know how glad I am to have you with us. Let's forget all that childhood silliness. How do you like this evening frock? Isn't it pretty?"

"It is pretty, Joan, but it doesn't make you any more beautiful than you really are," complimented Bob, meaningly. "You are beautiful, Joan!"

"Do you think so, Robert? Father sometimes says I'm a little hellcat with horns on. But I guess I am a little wild at times," she laughed.

"Your father don't seem to realize that youth must have an outlet for its bubbling vitality, Joan." Then he turned to me as I sat regarding them through half closed lids. "You've got to expect youth to be wild at times, Mr. Holdon. I'm sure Joan knows what she's doing."

"Humph!" I grunted. "You might be right but I'm not going to admit it! I had a young colt once out in California that was as wild as Joan and———"

"Oh daddy dear, I've heard about that colt for fifteen years," Joan laughed, dashing over to my side and placing a sweet-scented hand over my lips. "Haven't you ever thought of burying it?"

"Alright, youngsters, have your fun while I order dinner sent up. Just make yourselves happy and forget about everything but bubbling and silly youth. I'll call you when dinner is ready."

"*Filet mignon et table d'hote* for Bob and daddy," Joan called after me as I walked toward the Automaton Service Control hidden behind a beautifully-carved closet door in the dining salon. The Automaton service had become a boon to hotel and apartment dwellers in 1941, lowering the cost of living considerably and doing away with whatever maid and valet relief that was required in the earlier days by fashion and leisure.

I glanced over the menu board, controlled automatically from far below in the chefs' kitchens, pressed a series of buttons on the panel and a few minutes later a low buzzing sound issuing from an announcing cowl, told me that our dinners had arrived. I busied myself setting the table. Usually Joan's nimble hands decorated the dining table, but on this occasion I undertook to perform those details myself, allowing Joan and Bob to enjoy a few quiet moments in the living room before his departure in the *Annihilator*.

Frequently, as I busied myself in the dining salon, I could hear their laughter. I conjectured that they were discussing their younger days together and I listened intently, for it is the gay spirit of vigorous youth that makes life worth living for the elder generation.

"Don't be silly, Robert," Joan was laughing. "Ralph Jordan never did mean anything to me."

"Well, all the kids in our set considered him your beau," Bob said, seriously.

"Ralph was a nice boy, and he was the only one who did not take great delight in teasing me. But Ralph isn't the kind of a man that appeals to me. He simply cannot keep up my pace. He's too old-fashioned and still clings to a slow old plane that has been in his family for years." Joan said, meaningly.

"That's comforting, Joan," Bob whispered, "Maybe I'm not too late."

"I never dreamed you felt that way toward me, Robert," Joan replied.

"No?"

"You always seemed too interested in aero-dynamics and physics to pay any attention to me after we outgrew our childhood bitternesses."

"But I always had an indelible picture of you stamped in my mind, Joan. I always hoped that perhaps someday——well, that we might meet again in a more pleasant manner."

"Why, Robert——"

"Oh, I've always loved you, Joan!"

Joan was searching his eyes intently. I had a guilty feeling as I watched, unobserved. Bob's face was flushed but his eyes were on Joan, glowing with admiration. Dinner was ready and waiting on the table yet I hesitated to interrupt them. A feeling of content surged through me. What could be better than a match between the son of my dearest friend and my own wild, impulsive Joan? I turned away and sat down in front of my television for the news of the day, leaving the two in the living room to their own thoughts and aspirations, although I wanted Bob to explain to me the principles of the great *Annihilator*.

At the touch of my fingers on the tiny button switch, the television screen glowed before me. I moved the single dial control gently and as has been my habit, I tuned in on the government weather bureau in Washington. Softly the features of the official announcer appeared on the screen. He began his usual droning report. I throttled down the volume of his voice.

"All aircraft flying lanes over the Divide are advised to shift 43 kilometers to the south of the Denver summits to avoid a terrific up-draft of air sweeping upward from latitude 17 today," the announcer was saying. "This upward pressure, P/Po density of o-375 velocity, is lifting from 50 feet, to an elevation beyond the surface of the earth's atmosphere. All craft are warned against the up-draft, for its upward suction is reported by the Rocky Mountain weather observer to be more rapid and pronounced than it has been for many years. A powerful electrical storm is reported raging in that vicinity at an elevation of 80,000 feet, o.90 to 1.4 kilograms per centimeter of width. Stay clear! All craft pulled into the draft will be drawn up into the outer atmospheres with no hope of returning to earth. D.M. announcing. Please stand by for further storm warnings!"

Allison Boasts

"LORD," I whistled, "I'd hate to get caught in that up-draft! It's a wonder that science has not found some way of breaking the force of it. That pressure forming a down-draft on one side of the Divide over the ridge and an up-suction on the other with a wide ratio, causes more serious accidents than all the air-pockets over the Pacific between San Francisco and Hawaii. Oh, well, that warning will keep planes away from the draft. They'd be fools to fly into it!"

"What's the matter, daddy, your face is the color of chalk?"

Joan was standing beside the set dining table with a hand looped through Bob's arm. They were smiling happily.

"The Washington bureau just announced that a high-velocity up-draft is sweeping upward over the Divide. I was thinking what a terrible thing it would be to be drawn up into the outer reaches of the earth's atmosphere with no hope of getting back to earth. That means any ship caught in it would be shot out of the earth's orbit where the absence of gravity would pull the craft into the infinite, probably to spin around the globe eternally like a new satellite."

"Oh, daddy! Your imagination is running away from you! Nothing like that could happen," Joan said, with a shudder. "Have you got dinner ready? We've just time to eat and inspect the *Annihilator*."

"Nevertheless, my dear," I said, "you are not going into the air tonight! No telling just what direction that up-draft will shift. I'm not taking any chances of you attempting to explore the outer atmosphere of the earth!"

"That's right, Mr. Holdon," Bob said, holding a chair for Joan at the table. "Such explorations should be confined to the *Annihilator*."

"You don't mean, Bob," I inquired, "that the *Annihilator* could navigate that powerful Divide pressure?"

"The *Annihilator* can conquer anything but interplanetary travel, Mr. Holdon," he answered, proudly. "She's not quite strong enough for that."

"But you wouldn't attempt to fly through the pressure of a high-velocity up-draft, would you, Robert?" Joan asked, nibbling daintily at a wafer, plainly alarmed.

"I wouldn't, of course, Joan," Bob said, smiling affably, "but if our orders were to fly a straight course from Denver to New York we could hardly escape the draft. I'm sure the *Annihilator* can pass through it under the force of her powerful driving exhausts."

"You have a lot of faith in that ship, Bob," I said. "Aircraft have been destroyed in Divide drafts for years."

"That's true too. But no craft as powerful as the *Annihilator* has ever been drawn into them," he smiled, enthusiastically.

"Just the same I am, proverbially, a Missourian. I've still got to be shown," I said with an uneasy laugh.

Following the very pleasant dinner, we donned our jackets and helmets and were lifted up to the port of landing on top of the towering Wright obelisk. The sky to the east was murky with a heavy mist. Black clouds hovered high overhead and the ominous roar of distant thunder could be heard frequently. The sun had set in a horizon of blood-colored clouds and the very atmosphere seemed foreboding. Yet in spite of a pending storm, commercial craft dotted the sky hurrying to reach their destinations and discharge their cargoes and passengers. From the murk high overhead came the periodical hooting of some huge craft's right-of-way horn. Ordinarily, the usual storms and uncertainty of the elements would not prevent craft from keeping aloft, for air vessels were constructed to withstand them. But the ominous warning from the Washington Weather Bureau had obtained results in so far as pleasure flight was concerned.

Presently, Lieutenant Allison obtained the necessary passports permitting Joan and me to enter the *Annihilator*. He ushered us into a receiving elevator that had been dropped from the interior of the craft to the floor of the landing and we were lifted into a spacious and luxurious reception room. Joan paused to greet an acquaintance while Bob handed our passes to the Officer of the Day sitting at a little desk near a rigid, metallic door that opened into the central chambers of the ship.

"Pardon me, Joan." Bob smiled, taking her by the arm. "We've got to hurry. The ship leaves on schedule."

I trailed along behind them as they entered the ship's huge interior.

Considering the arrangements of the cabins in the big craft, it was not so terribly different from the usual palatial airliners in hourly service between New York and Paris or Los Angeles and Shanghai across well-established airlane routes. It contained a great, luxuriously decorated dining hall for commanding officers and guests, well up forward. Officers' cabins, spacious and neat, with double white metal bedsteads, lined a network of wide hall-like companionways.

Occasionally it was necessary for us to drop down small flights of rigid stairs and cross over metal webbings to get to other sections of the main deck. I inquired why this was necessary and I was astonished to learn from Bob that all decks were suspended on a gyroscopic principle, like the old-time floating compasses of the early mariners. By this principle, he explained for my benefit, the decks would remain on an even, flat surface, regardless to whatever angle the body of the craft might be tilted.

"You see, Mr. Holdon," Bob explained, hardly removing his eyes from Joan's enticing features, "this ship is constructed on a sort of a fourth dimensional principle. There are many new features that have heretofore been untried. The gratings which we just crossed over are more or less heat radiators. It gets mighty cold above the 50,000 foot elevation and we must have warmth. The *Annihilator* departs abruptly from the old type of airship and is of rigid construction throughout its exterior.

Something New In Aeronautics

"THE *Annihilator* is constructed entirely of cobalt-steel with the interior structure of four-electron Beryllium, the strongest and lightest metal known. The cobalt-steel structure is highly magnetic and to a great extent conquers gravity through magnetic repulsion. This is the first vitally important step of science toward the expansion of phenomena of electromagnetism. To be perfectly frank, this ship can actually fly without the use of the exhaust drive or any other medium of propulsion. Magnetized cobalt-steel, with its power to repulse the gravitational pull, can carry this craft through the air at an astounding velocity. But by adding the exhaust driving system, much has been added to the speed of this type of aircraft. The velocity is increased some six hundred miles per hour.

"You are probably aware, Mr. Holdon, that these equations of gravitational repulsion are not entirely new. The famous Einstein theories of the old days on relativity have just been developed. American scientists, working secretly in the Washington Laboratories of the government, have at last succeeded in insulating against gravity, proving the Einstein theory that electromagnetism and gravitation are actually the same thing. According to the theories of Dr. Bryce B. Sheldon, head of the Department of Physics at the Kitty Hawk Laboratories, we need not be surprised if interplanetary travel will shortly become a reality through the medium of electromagnetism."

"Now, daddy, you understand everything about the construction and gravitational repulsion of the *Annihilator,*" said Joan with an excited laugh. "Lets see if you can remember it all. Robert, you certainly understand your physics and aero-dynamics, don't you?"

"And blamed little about women!" I put in.

Bob's skin colored under a flush.

"I don't know about that, father," said Joan in his defense. "He isn't so shy as one would think."

"All the same he's not a ladies' man, Joan," I said, "else he would have had a fine time trying to explain the development of electromagnetism, cobalt-steel and Einstein theories. By the way, Bob, what are the collapsible aerofoils along the side of the ship used for when it can rise and land by gravitational acceptance and repulsion?"

"Oh, you mean the safety aerofoils? We were testing them out on landing. They are used for a gliding landing if anything goes wrong with the electro-magnetism generating system. It does take a lot of work to absorb all that stuff, Mr. Holdon, but now that I'm beginning to learn something about eternal femininism, I think I shall ask for a transfer to the San Diego station so I can fly over here in an hour or so.

"I see! I hadn't thought of the aerofoils as safety units," I said. "It would be nice to have you near here. We could see you often. What do you think about it, Joan?"

"I wouldn't mind it at all, daddy," she replied, looking at Bob squarely. "But didn't I hear you say yesterday that you intended to visit Kitty Hawk for a month or so?"

"Really, Mr. Holdon?" Bob asked, eagerly. "Of course you both will be my guests when you come. I'll be waiting for you."

"I'm not certain yet, Bob. I'll think it over tonight and let you know in the morning," I returned. Bob looked at the chronometer strapped to his left wrist.

"I'm afraid we'll have to take a hurried glimpse at the under-decks, control cabin and mechanical compartments, Mr. Holdon," he said, excitedly. "It's almost time for us to take off and I want you both to see them."

"Perhaps we'd better just look at the controlling system, Robert," Joan put in. "You can explain the mechanical units as we go along."

"Well, to tell the truth, there really isn't much to see in the mechanical compartment," he said, smiling. "In fact there's nothing in the way of open apparatus—it's all rigid and stationery and operated along the air-current principle. Everything is encased in Beryllium housings and various gases are forced from supply tanks into the explosive chambers and vented through the driving exhausts. There are several generating dynamos operated from special air-pressure tanks, that furnishes the electro-magnetic power for the repulsion of gravity. Of course you understand that the ship is not capable of nullifying gravity in its entirety. But to a large extent, the insulation against it makes it possible for us to rise straight up to a certain elevation where a diminished gravitational pull exists. We will eventually insulate against that too."

We walked along a wide, central promenade toward the sharply pointed nose of the *Annihilator.* Joan watched Bob's face intently as he explained some of the more important principles in the construction of the great ship. Frequently he gave her arm a gentle squeeze and they both smiled. As fine a couple and as healthy and vigorous a pair as I have ever seen, I said to myself, admiring Joan's shapely figure, and Bob's squared military shoulders.

CHAPTER III

The Take-off

WE had no more than entered the control cabin and concentrated on the maze of instruments it contained, when a loud gong sounded somewhere within the ship. I was disappointed when Bob explained that it was the signal for all members of

the crew and officers' staff to report at once for the take-off. I glanced around the control cabin trying to appraise the many and varied instruments that it contained but Bob's voice called my attention from them and we returned to the craft's discharging elevators.

Night had fallen when we found ourselves deposited on the landing. In spite of the glaring flood-lights that bathed the entire airdrome and its brood of aircraft in white, I could see occasional flashes of lightning flaring jaggedly from behind banks of ominous black clouds toward the east. For miles and miles the Divide appeared to be blanketed with a cloak of milling, twisting cloudbanks, outlined clearly by the jagged streaks of electricity. Few planes were in the air and they were marked with their own brilliant aileron and aerofoil lights, typical of restless commercial craft. They scudded through the air swiftly, like scattered nightbirds.

"I'm sorry, folks," Bob said with a resigned gesture as we stood for the last few minutes with him before the scheduled departure of the *Annihilator*, "I'm sorry you didn't have a chance to see the controlling system of the *Annihilator*. Really it's worth seeing."

"That's perfectly alright, Robert," said Joan, placing a hand on his sleeve, "that will be an incentive for you to come again—to show father the controls."

"Don't listen to her, my boy," I said, "It will be an incentive for us to visit you at Kitty Hawk! I've got to see through that ship and I'm sure Joan would like to go through it again with you."

"That's great, Mr. Holdon! I'll tell dad that you are coming and he'll be down from Washington to see you." Bob said, pleased. "I've got to get aboard now. I don't want to be left——as much as I'd like to remain here. I'll be expecting to see you both in Kitty Hawk sometime tomorrow." He turned to Joan. "Good-bye, Joan," he said. "You'll come, won't you?"

"We will, Robert," she replied, earnestly. "We'll leave in the morning and be in Kitty Hawk in time for afternoon tea. My speedster can do it in three hours!"

"Will you go to the Officers' Club dance with me tomorrow night?" he asked, eagerly.

"If you want me to," she whispered, softly.

"Thank you, Joan! Good-bye, Mr. Holdon. See you tomorrow. By the way, we'll broadcast our voyage to New York. You can pick us up with your television, if you wish, but we will not be able to talk. With your 42 power receiver you ought to be able to follow the ship through. We broadcast at 24,500 Kilocycles on the 14 channel band."

"Good-bye, my boy," I said, as he took Joan's small hand affectionately. "I'll watch you all the way to New York. My regards to your father."

With that, Lieutenant Allison entered the open shuttles of the receiving lifts and was wafted up into the control room of the *Annihilator*. Presently we saw his face at a control cabin window. Joan waved a hand. I smiled up at him pleasantly and nodded.

Suddenly a hissing sound surged through the *Annihilator* and I hustled Joan away. Spectators had already taken to a safe distance. The body of the ship seemed to glow for an instant as the magnetic energy passed into its cobalt-steel casing. Insulation, repelling gravity, had been contacted and the ship rose into the air gracefully and swiftly, her driving exhaust tubes silent and dead. With an eagle-like swoop she turned her nose upward in a half loop and headed eastward into the thick, murky haze. Long streamers of brilliant light shot ahead of the ship and from the cabin windows along her trim stream-lines, there came the constant glow of her internal lights.

We watched the *Annihilator* as she passed out of vision into the eastern blackness. She raced more than five miles eastward before she suddenly opened her exhaust tubes. Where we stood we could hear the steady roar of her propulsion explosions. The roar gradually died away as the great craft gained momentum. Occasionally we caught a glimpse of the streaks of fire trailing along in her wake. Gradually they too disappeared into the blackened eastern heavens. Quickly, Joan and I walked into an open elevator and soon found ourselves in the apartment, glad to feel the warmth of the automatic heaters, for it had grown chilly on the landing.

Presently I found myself studying Joan's radiant features. Her dark brown hair hung in thin, curling whisps around her temples. She had donned a comfortable dressing grown and was seated on the divan, scanning over the pages of the Aero-Chronicle. Oddly she seemed a very different girl from her usual confident, impulsive self. Ordinarily at this time she would have been scudding across the sky to visit some friend miles away or transporting her chums to a party in her snappy little aerospeedster. Now she remained at home for a quiet evening for the first time since we had taken up our abode in Denver.

"What's the matter, Joan dear?" I asked.

"Nothing, father," she replied without lifting her face. "I just feel like staying home this evening. Why do you ask?"

"No reason at all, dear. I thought it rather odd that you would elect to remain home with me so suddenly. It's going to be a bad night; isn't it?" I said, walking over to my eastern exposure to scan the sky.

What the Television Showed

THROUGH an almost constant display of lightning I could see the black clouds in the east, tumbling violently under an upward pressure. The heavens over the Divide were in an uproar. Thunderous claps reached my ears and lightning flashed in long, jagged streaks that seemed alive with fire. A terrible, frightful night over the Rocky Mountain summits! But aircraft would avoid the upheaval of the elements at merely the cost of a slight delay.

Hardly more than ten minutes had elapsed following the departure of the *Annihilator* until I donned my smoking jacket and sat down at the television receiver. Slowly I adjusted the controls and gradually the long shape of the air-leviathan loomed on the screen, glistening under a coat of ice, which was very unusual for this season. She seemed to be in the very center of a terrific storm and while the atmosphere seemed void of snow, the ship was actually encrusted by ice! She was traveling at an amazing velocity and I tuned in the powerful radio reception units of the television. Suddenly the hissing roar of her driving exhausts came in through the super-dynamic reproductive coils. The suddeness of its roar and volume caused Joan to jump, nervously, stifling a little cry. I throttled the instruments until the roar was barely audible. Claps of thunder frequently caused the coils to sputter, and flashes of high-tension lightning created an occasional glow along the reducing units.

Joan walked to my side and sat down. I turned on the double-wave screen in front of her and tuned it on the 14 channel band. The *Annihilator*, pitching peril-

ously and fighting to retain even keel, glowed on the screen. The great craft was at last above the Divide, enveloped by upward tumbling clouds that whirled toward the infinite like the spinning cone of a tornado. The roar of a terrific suction-pressure and the low steady moan of the ship's driving exhausts, sounded ominously in the reproduction units. Yet in spite of the maddened elements, the *Annihilator* seemed to be holding her own and I patted Joan's tensed hands assuringly. She stared at the glowing screen, a worried look on her ordinarily joyously alive features.

"They'll make it, Joan!" I said, although I was keenly afraid that the terrific up-draft would win over such a huge craft as the *Annihilator*. Despite her super-powers to combat the elements, I felt that she was meeting her match in the whirling, upward pressure!

"But, daddy," Joan said suddenly, "she doesn't seem to be moving ahead at all!"

I stared fixedly at the screen. The *Annihilator* was pitching and rolling dangerously, her nose leaping in quick jerks toward the upper levels! Her pilots were fighting madly to keep her nose pointing to earth but with each terrific upward jerk, she was lifted skyward at an increasing angle. The *Annihilator* had encountered an up-draft, more terrible in its form than it had been for nearly a century!

"My God, Joan!" I gasped, "They're in it! Tune your screen in on 24,500 Kilocycles slightly under the 14th channel band and pick up the ship's control cabin!"

Instantly Joan's quick fingers manipulated the dials and the surface picture of the *Annihilator*, rolling and tumbling madly, disappeared from the screen. She switched on the reserve reproduction coils, automatically breaking the circuit in the coils at my hand, and, simultaneously with the sound of shouting voices, her screen glowed with a clear picture of the cabin's interior! Together we watched the perilous motion of the craft and the excited pilots controlling the ship from her cabin. Alternating my gaze between the two glowing screens, I immediately saw that Lieutenant Bob Allison was sitting at the wheel controlling the stabilizing aerofoils at her tail, his face grim, determined and pale. His hands clung to the jerking wheel with a grip of steel. He manipulated the control forward occasionally and just as often the tremendous force of the up-draft shot it back. He groaned once when the controlling wheel shot back, pinning him between it and the rigid accommodation in which he sat. He worked the wheel forward slowly. Each movement of the controlling system was clearly defined on the screen in front of me, for each time Bob shoved it forward, the *Annihilator* smoothed out, her nose pointed slightly to earth.

Joan watched Bob Allison intently as he strove to prevent the ship from shooting into the upper atmospheric reaches. I glanced at her face. It was white. Her lips quivered slightly as though stifling a sob. I said nothing, and concentrated on the scenes before us.

That Bob was weakening at the stabilizing control was easy to be seen. I groaned and Joan placed a shaking hand on mine. Suddenly his voice, weak and shaking, calling for assistance, came to us through the coils. Again the wheel shot back and struck him across the chest with such force that it caused his face to color with a bluish tint. I noticed a thin trickle of blood oozing from the corner of his mouth. Joan screamed and hid her eyes. Bob slumped in his seat, his hands frozen tightly on the wheel. There was a scurry of activity in the cabin as other pilots dashed for the snapping control. I tore my eyes from the cabin scene and glanced at the ship entangled in the whirling elements.

Scarcely had my eyes settled on the tumbling craft than her nose shot upward with a terrific jerk! Instantly the *Annihilator* rolled over, on end, and plunged like a comet toward the upper reaches. I cast a rapid glance at the other screen. The cabin was in an uproar and men were milling frantically back and forth across the even surface of the gyroscope floor. Bob still sat in the pilot accommodation while two relief pilots clung rigidly to the wheel, snapping them back and forth like whip-lashes. Bob was senseless from the steady pound of the whipping control against his breast. I stifled a groan. There was the son of my dearest friend, in mortal agony and perilous danger, before my very eyes, and I was powerless to aid him! Joan stared at the scene through wide eyes that were moist and red. I felt a lump rise in my throat. Here was the end of the *Annihilator*, I thought, and——the abrupt passing of Robert Allison who seemed as much of a son of my own as he was of my friend, Senator Allison. I wondered if the Senator was aware of the catastrophe. He probably was, I decided, and like ourselves, was watching through his television screens, each sickening plunge of the huge craft.

Beyond Gravity

SUDDENLY a bright flash crossed our screens, and from the coils at Joan's side came a quick, sharp voice. I listened intently. Joan bent over slightly, dabbing her eyes with a tiny square of silk. Crisp and curt came the words through the coils.

"Official government orders," the voice said authoritatively, "All radios and television receivers and broadcasters are ordered off the air at once! *Annihilator* lost in terrific Rocky Mountain up-draft! Government demands all broadcast and reception right-of-ways at once for communication with the ship without interference! Anyone disregarding this official command will be dealt with accordingly. Off the air until further notice!"

With a muffled oath I switched off the receivers and turned toward Joan. She had gotten up and had gone over to sit upon the divan. Her face was buried in her arms and her form was convulsing with sobs. I sat down beside her.

"Joan, darling," I said, struggling to swallow the lump that had risen in my throat, "he'll come out all right. Don't cry, Joan!"

"Oh, I'm so afraid, daddy," she sobbed, nestling her head on my shoulder, "that Bob will never return to me. Think of the sadness in the loss of all those brave men in the *Annihilator*."

"I know, dear," I said, forlornly, "but we've got to expect such things——we've got to accept them like genuine men and women. Aviation must progress and develop. Life does not count!"

"Life counts with me, father," she sobbed, sternly and seriously. "I never was more happy in all my life than I was this evening with Robert!"

"Do you care for Bob, Joan?" I asked, tilting her tear-dampened features up to me.

"I've always cared for Robert, daddy!" she said without hesitation and with feeling. "You know that I've talked about him always."

"Bob Allison is a man, Joan dear," I said, feeling the

lump in my throat more than ever. I had denied Joan nothing in all her life but here was one time when I could not help her obtain her heart's desire. I could not bring Robert Allison back to her. I would have gladly done so were I capable!

"He's like his father! Both are good men and true! I'm glad, Joan darling, that you feel that way for Bob."

Suddenly the Automaton Service System in the dining salon buzzed. I patted Joan on the shoulder and walked over to the panel and pressed a button over the mail receiving tubes. Instantly the latest edition of the Aero-Chronicle shot out into its reception chamber. I tore it open and read the headlines nervously.

"U.S.A.F. Annihilator Lost in Terrestrial Storm. Government Reports Ship Located Out of Globe's Orbit. Racing at High Velocity Opposite to Earth's Motion. Hold Little Hope For Its Return To Field of Gravity."

Stunned, I sat down again beside Joan and handed her the paper. I turned my head away to hide hot, stinging tears that had welled up suddenly in my eyes. The reaction left me in a daze and it was with an effort that I rid myself of it.

For long, torturous minutes that seemed like eternal ages, we sat there, Joan reading aloud the Aero-Chronicle's account of the disaster. The lines, as she read them, were punctuated with deep, long-drawn sobs.

Presently she grasped my arm and shook it.

"Look, daddy!" she sobbed. "Read this about Robert!"

I winced as I accepted the paper and read a short paragraph in black agate type. Slowly I read the paragraph again to escape nothing.

"'Lieutenant Robert Allison, chief pilot of the craft, and son of Senator Allison, was seriously injured when the stabilizing control wheel snapped back and crushed several of his ribs, according to radio-telepix reports received from the *Annihilator* by the Government station at Washington. Lieutenant Allison's condition is considered serious by attending physicians on board the ship as the result of slight lung puncture caused by a fragment of bone. He is reported to be resting easily, however, in the *Annihilator's* hospital and arrangements have been made for an operation. Physicians are prepared to operate at any moment, the report stated!"

I cast the paper aside and stood erect. Joan sat, staring straight ahead through wet, unseeing eyes. I began a ceaseless march back and forth across the living floor. It was impossible for me to sit still in the face of such a sudden and unexpected tragedy.

Unable to withstand the torture of inactivity, I walked swiftly over to the television receivers and sat down. What was patriotism anyhow when the son of my dearest friend——our own Bob, lay hovering between life and death beyond hope of ever being seen on this earth again? The government would not know if I switched on the current of the receivers for a glimpse at the *Annihilator* and her difficulties! What if it did! I could afford to pay the heavy fines exacted for ignoring government commands of this order, and surely I would not interfere with official communication.

Decisively I lifted a hand to the circuit switch and pressed it up. Instantly the screens glowed, showing two contacts——the government station at Washington and the *Annihilator!* Nervously I watched the huge ship, now on even keel and racing at terrific velocity across the heavens at an elevation high above the range of ordinary aircraft. In an instant the ship passed out of the screen——only the Washington station remained fixed. I turned the dial gradually to the left and slowly the ship's rear aileron interals crept onto the screen. I continued to move the dials to maintain the ship's presence on the screen. From the reproducing coils came the droning voices and I listened intently.

"Hello, Washington," an understandable voice was saying. "Are you still with us?"

"Yes, *Annihilator,* we are with you!" came another voice, louder and more distinct, in answer. I knew it was the Washington operator speaking. I looked around for Joan. She had disappeared. The Washington man continued.

"Senator Allison inquires about his son, Lieutenant Allison. How is he getting along?"

There was a brief pause then———

"Hello, Washington!" the *Annihilator* operator called. "Dr. Banksley reports that Lieutenant Allison is doing nicely after a fourth dimensional operation. Atomic *Argonite* has been injected into his blood and he's coming along fine. But what good———"

"That's fine, *Annihilator!* Report to Commander Rankin that we are doing all we can to bring you down. What? Your oxygen generators are out of commission? Talk louder, *Annihilator!*" the Washington voice cut in.

A Ray of Hope

MY sudden joy at hearing of Bob's improving condition was short lived. I hesitated to call Joan to tell her what I had heard. I continued to listen. The voice of the *Annihilator's* operator was becoming weak.

"Oxygen generators are out of commission due to some atmospheric pressure," he said, weakly. "Commander Rankin reports that the electromagnetising units are working perfectly and they are trying to obtain enough gravitational force for a drop through the narrow pocket over San Diego, California, latitude 30, longitude 9dc. We exhausted our reserve driving explosives bucking the up-draft head on. He says if you can get to us about a pound of concentrated nitro-radium we might be able to force the ship through the atmospheric stream into the pocket and bring it down. He believes we can do it with nitro-radium in the exhaust system. But for the love of God, hurry! We'll be over San Diego at five o'clock sharp in the morning! Rankin says if you get it to us through the pocket we'll pick it up in the nets as we pass over it and drop down to earth, if we can, on the next revolution! If you fail it's good-bye!"

There was a buzz of conversation in the Washington station as the *Annihilator* shut off her radio-telepix system. I thought I heard Senator Allison's voice and was half tempted to make contact with that station but thought better of it. I felt overjoyed at the unexpected developments, although I had a guilty feeling for having deliberately disregarded the stern orders from the government to keep all radio and television currents shut off. But no matter, if my offense had been detected, my rising hope would be more than worth the cost. I switched off the receivers and looked

for Joan.

Scarcely had I rose from my chair in front of the television, than the Automaton Service buzzed again. I fairly ran to it to receive the latest edition of the Aero-Chronicle containing up-to-the-minute developments and official governmental bulletins.

Quickly I glanced over the single page of type. The headlines glared with encouraging hope. Statements by many prominent scientists hailed the possibilities of future craft along similar principles of the *Annihilator*. Government officials openly complimented the ship's officers and men for their heroic bravery in the face of certain destruction. My mounting joy stopped suddenly however, when my eyes read swiftly over a notice that the ship had not yet been saved and that scientists and government officials ought to be working out ways and means of bringing it to earth instead of raving about heroism and infinitesimal possibilities with many valuable lives hanging in the balance. But nevertheless, hope was plainly written all over the sheet and I called Joan.

She came into the living room from the door of her chamber, her eyes dry but strangely blank. She smiled weakly and I placed an arm around her shoulders. We sat down on the divan and I explained to her in detail just what I had heard of the official communications between the Washington station and the *Annihilator*. Her face brightened perceptibly as I held the latest issue of the paper before her eyes. A short story in the center of the page told her that Lieutenant Allison was improving steadily after the operation and radium injections. She gave a happy little cry.

"Oh, I'm so glad, daddy dear!" she said. "I had given up all hope for him!"

"There's always a silver lining behind all the black clouds, Joan." I said, remembering the old saying of earlier days. I glanced at my wrist-chronometer. Joan straightened abruptly.

"What time is it, father?" she asked, impulsively.

"Why, darling, it's well past two o'clock," I replied.

"Then we've time to get to San Diego!" she exclaimed. We can get there before five to watch the rescue work!"

I stared at her, gaping.

"Why Joan, you are not thinking of flying to San Diego tonight——in this terrible weather, are you?" I asked, incredulously, but knowing that if she had decided to do that very thing, it would be beyond my ability to prevent her.

"I am, father," she said, rising from the divan, "and you're going with me! Run along now and put on your flying togs!"

"But, Joan————", I protested.

As usual I became the victim again to Joan's impulsive determination.

The flight from Denver to San Diego was nothing short of a nightmare for me. Joan's little streamlined aerospeedster sped through the sky like an arrow, its twin-screws with reversal motion, spinning at a terrific revolution. Rain and sleet beat down upon the tiny, transparent aerofoils of the plane with such force that I could not understand how such a frail-looking craft could bear up under it. But Joan paid no attention to the storm whirling around us. She kept her eyes glued to the instrument board, looking by turns at the glowing compass, the altimeter and the barograph.

I watched the barograph for a moment. The magnesium-tugsten-alumino propellers of the plane were revolving faster than ever before and were registering 16,542 revolutions per minute. The altimeter gave our height at approximately 21,000 feet. I drew Joan's attention to the Velocity-Indicator. She smiled and gradually increased the acceleration. The tiny ship shot ahead with a jerk and the Velocity-Indicator needle stopped at 750 miles per hour!

"Joan!" I said, heatedly. "You'll rip the plane to pieces with that speed! Hadn't you better slow it down? We've plenty of time to get to San Diego!"

"Don't fear, daddy," she answered. "This little speedster is capable of doing even better than that. I want to be in San Diego with time to spare. Isn't the moon pretty straight ahead?"

Far to the west the moon appeared through a bank of gray, seething clouds. Stars surrounded it and I felt relieved at knowing that better weather lay ahead of us.

CHAPTER IV
A Mad Flight

GRADUALLY, as Joan's aerospeedster skudded westward, the heavens brightened. The plane shot like a comet through banks of murky clouds and finally I scanned the earth through the transparent plates set in the floor. We were over the long, white stretch of the Mojave Desert. A sand-storm was racing to the north over the desert but we were high above it, the little ship bathed in the phosphorescent glow of the moon. Behind us a wall of black, tumbling clouds illuminated with frequent flashes of lightning, hung down from the higher reaches.

Joan deliberately disregarded all established airlanes and drove the plane in a straight line toward San Diego, the whine of the twin-screws muffled to escape detection by any Aero-Traffic Police who might be hovering in the air within the borders of California. Far ahead I could see, through the clear moonlit skies, a faint glow that guided aircraft to the landing on top of the towering, obelisk-like Lindbergh Aero Hotel, in San Diego. It glowed incandescent hovering on the edge of the far-off horizon. I could see the glow despite the fact that we were yet an hour from it. I glanced at the chronometer on the instrument board. We had been in the air slightly less than an hour. By computing the velocity of the plane I concluded that we would arrive in San Diego a good half hour before the time the *Annihilator* would pass over the perpetual air-pocket high above San Diego.

I scanned the space below us. We were passing over the central level of airlanes. Dozens of craft of all kinds were skimming along the usual routes; and to me, at our great elevation, they appeared like long lines of eagles and gulls, passing each other in independent flight. I heard the roar of powerful screws overhead. I looked up in time to see a huge airliner pass over us.

Presently I found myself silently speculating on the seeming impossibility of rescuing the *Annihilator*. My mind likened the disaster with the historical catastrophe of the submarine S41 lying at the bottom of the Atlantic beyond the aid of man. Then I began wondering how the San Diego rescuers would be able to compute the exact moment required in their attempts to deliver the driving-exhaust fuel to the *Annihilator* as she shot over the pocket, just outside the earth's atmosphere. It seemed an utter impossibility—as impossible as it was for deep-sea divers to go beyond their depth to attach oxygen-tubes to the S41, and to

raise it to the surface before life had fled from its human cargo!

With those dire thoughts in my mind, I dozed. Joan was too intent upon controlling the plane to engage in conversation with me, and as the aero-speedster sped toward its destination I slept, exhausted by worry and grief.

After what seemed an exceptionally brief period, I was awakened by a sudden shriek from the plane's right-of-way siren. I sat bolt upright, bewildered. Joan was smiling at me and motioned for me to look down through the floor squares. It was daylight and San Diego lay directly below us, its tall flat-topped buildings rising like monumental obelisks. Hundreds of aircraft skudded through the air at various elevations. Another day of activity had begun over the Southwest's aero-metropolis! The bay was dotted thickly with amphibian craft and the government aero-drome, with its swarms of fighting planes, stood out in bas-relief against the green of the area surrounding it.

Suddenly Joan tilted the aerofoil controls and the plane plunged headlong toward the earth. At a terrific speed it shot, plummet-like, toward the landing atop the Lindbergh Aero-Hotel. The building seemed to shoot up to meet us like some gigantic rocket. Wind whistled and whined along the narrow aerofoils of the speedster as it sped in a perpendicular nose-dive, toward earth. I sat in my chair rigid, struggling for breath. I cast a frightened glance at Joan. A determined smile played around her lips and her eyes sparkled with the joy of the thrilling drop.

"For God's sake, Joan!" I managed to say between choking gulps. "Remember that I'm an old man!"

"This will make you young again, daddy," she smiled. "But I promise not to do it any more with you in the plane. You're old-fashioned—like Ralph Jordan!"

"I'd rather be an old-fashioned fogey than an up-to-date corpse, Joan!" I said, as she twisted the speedster out of its nose-dive and pointed its whining aircrews toward the government aerodrome across San Diego Bay.

"We'll go direct to the government field, daddy," she said.

"But you can't make a landing there, Joan. You know they don't allow private craft to land on the reservation," I said.

"Just the same we land, father!" she replied, determinedly. "I'm going to be on the inside of the barricades when they begin to rescue the *Annihilator*. It will be up to you to get us out of any difficulties."

"I haven't any friends there, Joan." I complained. "I don't believe you ought to———"

"I don't care, daddy!" she said. "We are going to drop there! Tell them you are former Congressman Holdon and everything will be alright, I'm sure."

"Well, alright, Joan. Go right ahead!" I said with resignation.

Begin Firing

JOAN shot the tiny plane toward the government aerodrome, shut off the twin-screws and elevated the heliocopter blades. The plane hovered over the field for an instant and then dropped slowly to the ground without so much as a warning from its siren to tell of its arrival. It settled between two gigantic combat ships, their big guns casting long shadows that almost completely hid the streamlined speedster from the rising sun. But the plane had been observed on landing, and before we could get out of the cabin, armed guards had come up. I stepped out first, Joan hopped down beside me.

"I'm sorry, sir," said a debonair young naval officer as I dropped down to the ground. "I have an order for your arrest, sir."

"What are the charges, son?" I asked.

The young guard smiled.

"Landing on a government reservation, sir," he said.

I turned to Joan, grimacing.

"See what you've done, young lady?" I said, severely. "You've led us before a firing squad—it will serve you right if they shoot you at sundown!"

"It's not that serious an offense, sir," the guard said with a grin. "We don't shoot beautiful young ladies at sundown or any other time, sir. Though you will have to explain yourselves to the Officer of the Day."

"Oh, never mind the O.D., son," I said. "Take us direct to the Officer in command. I am Congressman Holdon and this is my daughter, Joan. We'll explain to the commander."

The officer gulped and his face reddened beneath his tan.

"Very well, sir. Follow me," he said, nodding to the other guards to disband. He turned on his heel and walked swiftly toward the administration buildings nearby. We followed.

"This is indeed an honor, Mr. Holdon," Commander Wilkins said after I introduced Joan and myself and explained our visit. "But I am very sorry that such an urgent cause brought you here. I have very grave hopes for our men recovering the *Annihilator*. You and Miss Holdon are welcome to remain to watch the work."

"Thank you, Commander," Joan said, pleasantly, glancing at her wrist chronometer. "Isn't it time the work began?"

"We begin firing at 4:50, Miss Holdon," Commander Wilkins replied. "And will continue at brief intervals until shortly after five. The *Annihilator* is expected to pass over here at exactly 4:59."

"Begin firing?" I asked, awed. "Do you intend to create a downward vacuum in the outer atmospheres with high explosives?"

"Not at all, Mr. Holdon," the commander smiled. "Our largest anti-aircraft guns in battery formation, are loaded with gravity nullifying cobalt-steel projectiles. Each one contains ten pounds of concentrated nitro-radium. These projectiles, insulated against gravity as they are, will be given greater impetus from the earth by the added force of high-explosives in the guns. As the *Annihilator* races along the other air-stream, magnetized steel nets will be hanging from her belly to pick up any of the missiles that might be in her path. Therefore our guns will hurl shells into the air through the pocket over which she will pass, five feet apart and at intervals of 30 seconds."

"Lord!" I exclaimed with apprehension and alarm. "Suppose she fails to pick up any of the projectiles? Then what?"

"Oh, father!" Joan cried. "They must not fail!"

Commander Wilkins hung his head and stared down at the toe of a restless, booted foot. I turned at the sound of a voice in back of me.

"Pardon me, sir," said a white-coated orderly. "Radiogram for Commander Wilkins from the *Annihilator*. I beg to report, sir, that the batteries are ready to begin firing."

Commander Wilkins dismissed the orderly and tore open the envelope containing the radiogram from the *Annihilator*. After a second he handed it to me and I read it aloud to Joan.

"Annihilator Will Pass Over San Diego Pocket, Longitude 9dc, Latitude 30° at Exactly 4:59, World Time. Everything Is Ready to Accept Your Deliveries of Nitro-Radium. Eight Members of the Crew and Staff Are Dead From Lack of Oxygen. If We Fail to Pick Up Your Deliveries We Cannot Hope To Last More Than Six Hours Or One More Revolution Around the Globe. Please Stand By For Results. We Are Coming!"

Joan stifled a cry of alarm. I handed the radiogram back to Commander Wilkins. Without a word he strode swiftly past us. We followed him to the anti-aircraft batteries. Like a long line of towering steel shafts the guns pointed to the heavens in a fan shape, in readiness to hurl barrages of projectiles into the path of the oncoming *Annihilator*.

Commander Wilkins mounted a steel platform and looked out over the towering batteries. I glanced at my chronometer and looked overhead. The sky above the airdrome was entirely void of any aircraft. High up, in the higher levels, a great white cloud floated lazily across the sky. Over the city of San Diego itself, their helocopters maintaining perfect balance, rested thousands of aircraft, their occupants intent upon watching developments in the rescue work of the great *Annihilator*. Joan clung to my arm, tightly, as we stood some distance away from the batteries.

SUDDENLY the batteries roared as one with such terrific explosion that the earth rocked and trembled. The concussion lifted us from the ground and set me down with a thump, Joan sprawled across my legs. I shot a rapid glance skyward. The heavens were depthless. But a gradually vanishing series of whining notes told me that the first discharge of fuel for the *Annihilator* was on its way. I pulled Joan down as she attempted to rise, and clapped my hands over my ears. Again and again the batteries roared at intervals of seconds. Joan hid her face against my breast, sobbing. I looked over toward the platform. Commander Wilkins was standing close to a waist-high railing, clutching it tightly. Other men sat on the floor of the platform. He alone was standing.

Hope Gone!

EVENTUALLY the firing ceased and I helped Joan to her feet. Commander Wilkins, followed by a knot of gesturing officers and civilians, was walking toward us. His face was grave as he came up and saluted politely.

"I should have warned you and your daughter, Mr. Holdon," he said, "that the concussion would knock you down. I am happy to see that you were not injured."

"That's all right, Commander," I said. "I couldn't have kept Joan away."

"Do you think you will have any success, Commander?" Joan asked, apprehensively.

"I can only hope for the best, Miss Holdon," he said.

Joan smiled with rising spirits.

"We are going to watch the *Annihilator* on the television screen, would you like to join us?" Commander Wilkins continued. Joan nodded. He turned to the knot of waiting men standing a short distance away. "Gentlemen," he said, "This is Miss Holdon and her father, former Congressman Holdon. They will watch the *Annihilator* with us."

With that informal introduction we accompanied the group to the Radio-Television Headquarters. As we strode toward the building I felt a hand touch my shoulder. I turned my head and observed the serious, set features of Professor Stilsen, Director of Astronomical Research of the Washington University.

"Why Professor Stilsen," I greeted him, "I didn't recognize you in the group! What are you doing here?"

"Have been vacationing up at La Jolla, Mr. Holdon," he said. "The government radioed me early this morning to come down here and help out as much as I could in gravitational and atmospheric details. I'm glad to see you, Mr. Holdon!"

"Thank you, Professor," I said. "It was nice of you to help out. Of course you know that Senator Allison's son is on board the *Annihilator*. He is a very close friend of the family. We flew over from Denver this morning to watch the rescue work. What do you think about it?"

"Well, to tell the truth, I'm a little doubtful," he replied, shaking his head seriously. "It is and has been my opinion that when the projectiles reach the same atmospheric stream that holds the *Annihilator*, they will either continue on through it or be swept along the same course as the ship. There is a slight chance that the Annihilator will pick up one of the shells, providing it passes over the pocket at precisely the same second the projectile reached the air-stream. On the other hand, the projectiles might strike the ship and damage it."

Hardly three minutes had passed after the firing of the last salvo from the batteries, before we arrived at the Radio-Television Headquarters. Commander Wilkins ushered us into the rather large room containing the powerful radio-telepix apparatus. The room beyond the reception and broadcast panels was something like a small theatre with a fairly large screen on the wall in front of several rows of chairs. We sat down, Joan on one side of me and Professor Stilsen on the other. Around us sat the remainder of the group, silent and tense. Commander Wilkins remained near the panels and its operators.

During the few seconds that followed, the silence in the room was oppresive. I watched Joan. She sat in stony immobility, her eyes boring into the blank, dead screen. Professor Stilsen likewise stared at the screen, his lips twitching nervously and beads of perspiration standing out on his brow.

Presently the reproductive coils somewhere near the panels in back of us sputtered. A dim outline appeared on the screen before us. Joan grasped my arm tensely. Gradually the glistening body of the *Annhilator* loomed and quickly passed out of sight. The operators twisted the television dial-controls and slowly the leviathan moved back into the oblong square in front of us. Professor Stilsen let loose a groan and pointed with shaking hand along the tail of the huge ship. The aileron laterals and elevating aero-foils had been torn from their sockets and were trailing along behind the craft at a distance that, on the screen, appeared to be several feet!

"My God!" the Professor shouted almost in a frenzy. "They're done! The controlling aileron and

aerofoils have been shot away! One of our projectiles must have gone through the tail of the ship!"

Joan screamed and suddenly went limp. An officer sitting at her side got up and returned with a glass of water. I chafed her hands automatically, unable to tear my eyes from the screen. The *Annihilator* was racing across the sky like a comet, a mass of wreckage that had been her aileron laterals, following her! Around her, traveling at precisely the same velocity, were several tiny shapes that glistened under the glare of the sun. Some of the projectiles hurled into the air a few moments before had been wafted into the atmospheric stream circling the earth! There they remained near the *Annihilator* and yet too far away to be of any help to the distressed leviathan!

I felt Joan's hands quiver. I glanced at her quickly. She was reviving. I looked again at the screen. In the instant the scene had changed and in place of the *Annihilator's* surface, the craft's control cabin confronted us. God, what a sight! Men and officers alike, naked except for their trousers, sprawled on the gyroscopic floor! They tore at their throats with frenzied hands. Several still, immobile forms lay at one side of the deck, hands across their rigid breasts, embraced by death!

The reproductive coils howled suddenly and the operators throttled down the volume. From behind us came words that were punctuated with deep groans and wheezing coughs. We sat tense in our chairs. Joan's face was hidden behind my back to shut from her eyes the terrible sufferings of the dying men in the *Annihilator*.

"H-h-ello, San Diego," came the rasping words from the *Annihilator's* choking operator.

"We've got you, *Annihilator!*" came Commander Wilkins' voice from behind in answer. "What's wrong, *Annihilator!*"

"We're done——finished!" the ship's operator said in a dry, weakening voice that was filled with soul-searing sadness but void of fear. "One of your shells tore away the aileron laterals and elevating aerofoils. We have no control over the *Annihilator!* We picked up two of your projectiles but we cannot make use of them because your shell also destroyed the exhausts of the driving system! There's a gaping hole under the tail stream lines and what oxygen we had in the compartments is escaping. We can't last for another six hours, San Diego! Thanks for the nitro-radium. You did your level best. I guess its good-bye to every————"

"Wait a minute, *Annihilator!* Commander Wilkins' sharp, crisp voice shot through the speaking tubes behind us. "Don't give up like that! Where's Commander Rankin? This is Commander Wilkins speaking. I want to talk with him!"

"Don't give up?" the *Annihilator's* operator said scornfully. Then his voice came to us in shrill, hysterical laughter. Presently he seemed to get control of his reasoning. "Rankin, sir? I am sorry to report, Sir, that Commander Rankin has been unconscious for an hour. I'll send for Lieutenant David—"

Before the *Annihilator* operator could finish, our reproductive coils sputtered and went dead! The screen before us became suddenly blank.

"Hello, *Annihilator!*" Commander Wilkins called frantically into the speaking tubes. "What's wrong, *Annihilator!* We've lost you!"

The screen glowed for an instant and went blank again. I sat stunned at a few broken words that had come in through our reproductive coils, during the instant flash. The *Annihilator's* radio-television units had suddenly ceased to function——her electrical current exhausted! The operator had yelled at the top of his weakened lungs his final good-bye to the earth he had loved so dearly. Commander Wilkins cursed softly. Joan's form convulsed in spasmodic jerks.

"That's the end!" I said aloud, dropping my chin on my chest forlornly. Professor Stilsen's hand found mine and gave it an abrupt squeeze. I nodded, unable to lift my head.

CHAPTER V
A Mad Plan

FOR what seemed ages we sat there. The room was silent except for the sound of Joan's convulsive sobs and the heavy breathing of the others. I looked sideways at Professor Stilsen. His features were working oddly and his eyes glittered. Suddenly he arose, the scraping of his chair against the floor broke the stillness.

"By God!" he said, pounding his hands together in quick, steady claps. "That's not the end! We are going to save those men!"

Commander Wilkins eyed him with growing interest.

"Do it, Professor Stilsen," he said, tensely, "and you will have the eternal gratitude of mankind!"

"To hell with gratitude, Commander!" he shouted, almost running toward the officer. "If the government would listen a little more attentively to science this disaster would not have occurred!"

"What is your plan, Professor?" several officers asked simultaneously and eagerly.

"You wouldn't understand!" he shouted hotly. "I told you in the first place that there was danger of destroying the *Annihilator* with your projectiles. You wouldn't listen to me. But here's my plan."

Eagerly and intently the entire room gave its attention to Professor Stilsen. I placed an arm around Joan as I watched his perspiring features. He continued.

"That operator said they couldn't last longer than six more hours! Evidently they have enough oxygen for some of them to survive that long. In six hours the *Annihilator* will pass over this aerodrome again! I know that for certain! With the earth rotating at a velocity of 25,000 miles every twenty-four hours and the outer atmospheric stream racing in reverse of the earth's motion at twice the velocity of the earth, only six hours are required for the *Annihilator* to make the complete revolution! The very fact that it passes directly overhead is a phenomenon exactly in our favor. We've got to make use of it now, for at the next rotation of the earth the outer atmospheric stream will shift its course and the *Annihilator* will be gone forever!

"Listen to me! Laugh later if you want to but listen to me now! Commander Wilkins, you will order your ground shops to begin work immediately on constructing twenty-four huge cobalt-steel, kettle-shaped drums. I will give you exact specifications. Your mechanics will fit onto the open end of each of these drums, a six-inch thick, circular plate of steel! Socket-clamps will be attached to the rounded bottoms of the cobalt-steel drums to accommodate stationary cables and high-tension electrical lines! Get twenty-four large Pinkerton winches each complete with cable enough to reach a distance of 85,000 feet. Weld cables together if necessary. By my plans and figures the

cables need not be more than an inch thick.

"We will attach these cables to the socket-clamps. By electro-magnetizing the cobalt-steel drums you will insulate against gravitational force and they will voluntarily rise into the air, held captive to the anchored winches. The electrical energy will pass through the steel plate and produce a high degree of magnetism, forming a powerful electro-magnet. All twenty-four of the magnetic drums will be sent up to an elevation slightly below the atmospheric stream in which the *Annihilator* is held captive. I have figured that the magnetism in the twenty-four drums will exceed whatever gravity insulation that might exist in the ship. Consequently it will be attracted to the electro-magnets and be drawn down through the pocket into the earth's heavier atmospheres. By slowly reducing the electro-magnetism from the drums, leaving the current flowing through the steel plates, they can be lowered with the *Annihilator* resting on them under the influence of magnetic attraction. We will anchor out the ground winches at fifty feet apart, and permit the drums to rise directly in the path of the ship! I feel certain that this method will bring successful results by drawing it back into the earth's orbit!

"That is my plan, gentlemen, and if you agree with me let us get started at once! We have but five hours to finish all ground work and thirty minutes to raise the magnetic drums!"

Immediately the Radio-Television Headquarters quaked with resounding applause. I glanced at Joan. Her face was brightening I felt somewhat relieved. Surely this plan, formulated in the active brain of Professor Stilsen while he watched the terrible scenes on the television screen, would result in the rescue of the *Annihilator* and its men———if any still lived when it reached again the pocket over the airdrome. Professor Stilsen held up his hand impatiently to stave the continued plaudits of those in the room.

"Gentlemen! Gentlemen!" he shouted. "I am not entitled to your plaudits or praise! Save it for those brave men in the *Annihilator* and let us begin work at once. We need every single second!"

Commander Wilkins held out his hand. Professor Stilsen grasped it in a firm grip.

"Professor Stilsen," he said with exhilaration, "We will do exactly as you bid! Everything under my command is at your service. We have the men and the facilities necessary to carry out your plans, I congratulate you for the most feasible plan offered. My command is yours!"

"I couldn't do anything without your help, Commander," the Professor said, modestly. "Let us proceed with the work before us!"

Immediately Commander Wilkins spun on his heel and issued crisp orders to his subordinates in the room and then excused himself to the civilians. Professor Stilsen followed him out of the room. The others, representing various papers, remained in discussion while Joan and I made a hasty retreat. With five hours hanging on our heads, we had no desire to loaf around the airdrome in the agony of dragging minutes.

The airdrome had suddenly become a scene of ceaseless activity as we walked from the Radio-Television Headquarters toward our plane nestling under the shadows of the big guns mounted on the huge, combat cruisers. Men and officers were hurrying hither and thither, clearing the field or executing the crisp orders of Commander Wilkins. Great ships were being taxied off the field and as we arrived at Joan's little speedster and entered its comfortable cabin, the triple screws of the big combat cruisers beside us roared. They raced across the landing toward their hangers.

Joan shot her aerospeedster into the air vertically and headed its screws across the bay. Within a minute we dropped down on the landing on top of the Lindbergh Aero-Hotel, registered and went to the seclusion of our suite.

The Last Effort

NEEDLESS for me to tell what transpired between us at the Aero-Hotel. The minutes dragged slowly and we were at the point of nervous exhaustion when finally the hands on my chronometer indicated that the time had arrived for the rising of the magnetic drums over the airdrome. Quickly we donned our helmets and jackets and were soon up on the landing. Joan's plane had been hauled into a hangar and she stamped a foot impatiently as it was being brought out for flight.

Joan had long since recovered control of herself although her face bore an expression of pallid rigidity. She had offered silent prayers for the man she loved since childhood, hovering between life and death in the *Annihilator*. That he would still be living if the leviathan was actually brought to earth, was improbable. From her expression I presumed that she had resigned him to whatever fate held in store for him. With the choking words of the *Annihilator's* operator ringing in my ears, I could not see how Bob Allison, injured as he was, could survive without sufficient oxygen to maintain life in his already weakened lungs. And six hours is a very long time to live under those circumstances, I thought.

Presently Joan reversed the screws of her speedster and it halted over the airdrome with heliocopter blades whirling for a gradual descent. The little plane settled on the vacant field and we stepped out. A figure came running toward us with a warning to move the plane from the landing. Joan entered it again and taxied it into position near massed government ships at the end of the field. I was walking across the landing under the guidance of the guard when Joan came up to us, panting. She had ran across the field and the effort had returned some of the color to her cheeks.

As we neared a row of low, white buildings at the side of the landing I noted that they were strangely silent. The shriek and groan of machinery that was creating an uproar when we had departed for the hotel, had died down. The very atmosphere seemed tense. Eventually we entered the buildings and the guard led us at once to Commander Wilkins. He was holding a conference with Professor Stilsen and nodded as we came up to him. Professor Stilsen's face was grimy with perspiration and dust. The professor excused himself and walked away swiftly. Commander Wilkins turned nervously. Joan grasped his coat sleeve.

"How are you progressing, Commander?" she asked, tensely.

He smiled assuringly.

"Excellent, Miss Holdon," he said, his voice filled with excitement. "We had a little delay with the cables but everything is shipshape now. In a moment we will be ready to elevate the magnetic drums. The winches are anchored on the other side of the landing so as to pull the *Annihilator* down against the air-currents, and the drums are being welded to the cables.

We've worked ceaselessly with this job, Miss Holdon, and I feel confident that Professor Stilsen's plan for the rescue of the *Annihilator* will work out satisfactorily."

"That's great, Commander!" I said, enthusiastically. "The whole world will appreciate your efforts and I'm certain that the government will, too!"

"As long as we succeed, and Professor Stilsen gets his due rewards, I will be content, Mr. Holdon," he replied. "That Professor Stilsen is a veritable mountain of energy and knowledge! It is a shame that men like him are not in command of the government's powers instead of us who know practically nothing but militarism!"

There came suddenly from the outside, a shrill siren blast. Joan jumped nervously. I looked questioningly at Commander Wilkins.

"It is time! he said. "Will you join me on the observation platform?"

Before we reached the observation platform, Professor Stilsen had mounted it and was standing by the rail. A long table-like bench had been built on one side of the platform for newspaper representatives. They sat in a line, radiophones on their ears, talking steadily into individual speaking tubes that carried their words direct to the offices of their respective sheets, and automatically set the type from the vibration of their voices. The drone of their voices mingled together in a jumbled, unintelligable cacophony of unamalgamated sounds.

I helped Joan up the platform steps. Commander Wilkins followed close behind. Suddenly there came a distant hissing sound. Professor Stilsen had signaled for the high-tension electrical current to be turned into the magnetic drums. I hurried Joan to the top of the platform. On the far side of the landing stood a row of huge winches, their cables taut and rising skyward rigidly. I looked up. High overhead at an equal elevation floated a row of odd looking objects held captive by the taut cables. Even under the brilliance of the sun, they gave off a distinctly discernible glow. The magnetic-drums were in the air at last!

I glanced at Professor Stilsen. His grimy features were set. He held up an arm for an instant and then brought it down rapidly. Instantly there came a high-pitched shriek from the spinning winches, and the gravity nullifying magnetic drums were on their way skyward! I held Joan close to me as we watched the rising drums. They gradually disappeared into the fathomless skies and we could see them no more. We turned to Professor Stilsen. He stood tensely at the rail, staring into a small glowing screen in front of him that told clearly the upward progress of the drums. Commander Wilkins was at his side. Presently he gave another signal and the shrieking of the winches died down to a low moan and finally became quiet and still, their cables taut and rigidly motionless. The voices at the speaking tubes on the table-like bench droned excitedly.

Suddenly there came a loud snapping roar from the line of winches. Professor Stilsen groaned. One of the cables had parted several feet from the spindle and its frayed end, in contact with the high-tension wiring was shooting vivid, blue sparks into the ground. The winch glowed for an instant and crumpled under the force of the short circuited current. Joan covered her eyes as several limp forms were carried away from the spot.

"I've prepared against that," Professor Stilsen volunteered. "Our doctors will probably bring them to shortly."

CHAPTER VI
Pulled Toward Earth

COMMANDER Wilkins patted him gently on the shoulder. I glanced at my chronometer nervously, and toyed with a wisp of curling brown hair that hung from underneath Joan's helmet. She clung to me pathetically, her eyes on Professor Stilsen's broad back as though watching for some move that would indicate the presence overhead of the *Annihilator*. I too, found myself watching the tense form of the professor. Suddenly he stiffened and bent over sharply to stare into the screen in front of him.

"There she comes!" he shouted exultantly. "Her nose is dipped and she's standing still above the line of drums! The magnets are fighting the atmospheric stream and the *Annihilator* is being attracted down to them!"

With a shout of joy he broke away from the rail and danced wildly on the platform. Commander Wilkins continued to watch the screen as a cheer arose from the men stationed at the winches. Joan threw her arms around my neck and hugged me tightly. I felt a feeling of exhilaration surge through me and I offered a silent prayer that fate had not been too severe on the brave men inside the *Annihilator*.

I looked again at Professor Stilsen. He was standing at the screen once more, his hands gripped firmly on the rail.

"She's resting horizontally on the drums!" he cried. "One more second for the magnetic attraction to circulate through the ship and we will haul her down!"

He raised a hand over his head in preparation for the signal that would start the uniformly controlled winches rewinding the cables.

"We'll retract the electric-magnetism from the cobalt-steel of the drums," he said as if to himself, slowly lowering his hand. "They will fall gradually of their own volition, the attraction in the plating will captivate the magnetic body of the *Annihilator* and we will wind in the cables."

Despite the tremendous weight of the cables, the drums and the huge leviathan of the air resting on them, the winches rewound the lines without apparent effort. They hummed softly as the incoming cables wound around the huge spindles. High in the air hung a speck so infinitesimally small that my eyes could scarcely observe it. There came the roar of a million voices from across the bay and suddenly the atmosphere was torn with the shrieking of sirens and the shrill blasts of whistles. The *Annihilator* had been seen——she was being hauled to earth! The voices of the news reporters continued their ceaseless droning as they acquainted the world with the facts as they stood. Professor Stilsen sat down on a stool in front of the screen, mopping his brow with trembling hand.

Gradually the *Annihilator* was drawn earthward. It loomed in the heavens like a great bird suddenly stricken in flight. Hundreds of aircraft hovered over it like swarms of locusts attacking an eagle. They followed it at a distance as it came slowly down.

Without warning and with a suddenness that caused my breath to cease, the *Annihilator* literally tore itself free from the magnetic-drums and leaped back into

the sky! It shot heavenward, ploughing through a swarm of aircraft like an unleashed demon. The magnetic drums hung in position, deserted. I stood stricken, unable to tear my eyes from the terrible scene. Joan screamed, and at the sound of her voice I withdrew my eyes from the rapidly rising *Annihilator* and tumbling wreckage. I expected to see Professor Stilsen sitting on the stool, with his head buried in his hands. Instead he was once again at the rail, waving a hand frantically at the men lined along the winches. Instantly there came a rapidly mounting shriek as the cables spun from the spindles.

Professor Stilsen grasped a sparking tube that was lying beside the screen and yelled into it. I looked overhead. Rising rapidly and gradually decreasing the distance between them and the *Annihilator*, the magnetic-drums were shooting into the higher reaches at a terrific velocity. They glowed like green balls of fire under an increase of electrical current. Professor Stilsen yelled again into the speaking tubes and the drums vomited green sparks under additional current that was meant to hold the *Annihilator* at all costs should they make the magnetic contact again.

Slowly, very slowly the *Annihilator* checked its upward rise and rapidly the drums shot up under it. The huge leviathan finally floated motionless and then began a downward descent to meet the attraction of the magnetic drums. There came another thundering roar of voices from across the bay, and this time the *Annihilator* was alone——no swarms of aircraft followed her as she was being drawn slowly but surely earthward.

I turned to Commander Wilkins who was standing beside Joan, watching intently the downward course of the huge ship.

"They are either dead or unconscious from lack of oxygen, Miss Holdon," the Commander was saying "Otherwise she would not have torn herself loose from the drums."

"What has that to do with it?" Joan said, drying her tears.

"Well you see," he answered, "the ship's electric-magnetizing units must have been working perfectly, sending constant current through the cobalt-steel hull, creating an insulation against gravity. They could not have known they were over the pocket or did not care for that matter, otherwise they would have shut off the units in consideration of the possibility of unexpectedly dropping through it into the earth's heavier atmosphere. Had the units been shut off the *Annihilator* would not have shot upward. It would have crashed to earth."

"I understand, Commander," Joan said. "If the electro-magnetizing units had not been functioning, the ship would not have broken loose. The magnetic drums would have held it."

"That's right, Miss Holdon," he replied, looking up.

"Do you really believe they are dead, Commander?" she asked, her eyes filling again with tears.

"That is hard to tell," Commander Wilkins answered. "They may be unconscious or very near so. Probably those who are alive do not know that they are inside the earth's orbit again. They may have all the compartments closed to keep what oxygen they had in them."

Gradually the *Annihilator* dropped earthward, her huge body casting a long shadow over the airdrome. The winches groaned as they rewound the cables. Professor Stilsen sat like a marble image, watching. . . .

As a precaution against further disaster, he grabbed up the speaking tubes suddenly and yelled into them.

"Don't break the current in the magnetic plates until I order you!" he said, holding a tube to his lips and apparently speaking to the operators handling the electrical control systems of the magnetic drums. "Release the gravity insulation slowly from the drums and stand by your posts for further orders!"

Hopes and Fears

PRESENTLY the *Annihilator* touched the earth and rolled over gently, the magnetic drums still attached tightly to her glistening body. Immediately she became surrounded by milling workmen and there came to us where we stood on the observation platform the resounding beat of compressed air hammers and cutters as they strove to make an opening in the huge, cobalt-steel hull. There seemed to be nothing to indicate that any life existed within the *Annihilator*, and I hung my head. Joan clung to my arm, her body sagging.

Commander Wilkins nodded to me and I half carried her down the platform steps to the ground. With faltering steps she walked with us toward the *Annihilator*. Apparently from nowhere had come automotive ambulances and hospital planes. White-coated and trousered figures scurried past us carrying stretchers. I hustled Joan along to keep up with the rapid steps of Commander Wilkins and finally we arrived at the side of the ill-fated leviathan.

There came an exultant shout from a gaping hole in the side of the ship as the first limp form was handed through it into eager, waiting hands. I noticed a peculiar sound of whirring machinery issuing from the ship as we came up to it. Suddenly it ceased. The electro-magnetizing units had been shut down, but the magnetic drums still remained in position.

In a constant stream, limp human forms were handed through the gaping hole made in the side of the *Annihilator*. Joan tore her eyes away in time to forego the sight of one man, screaming wildly and hysterically, being brought from the bowels of the ship. As terrible as it was, it caused my hopes to rise suddenly, for if one man lived, there was an odd chance that life existed in others. Joan kept her face hidden behind my back. I continued to watch and presently my eyes beheld the familiar features of Lieutenant Allison. His face was pale as though in the embrace of death and I held Joan tightly as his inert form was given to waiting arms.

I had not wanted her to see that face but I could not withstand the agonized torture of standing there without learning of his fate. I decided that if Bob was dead we should know of it, and I hustled Joan from the milling crowd to follow the two men carrying his inert, death-like form across the field.

Slowly we followed and as we walked along in the direction of a long, white building over which rustled a Red Cross flag, I explained to Joan what I had seen. She gave a little cry and fairly flew toward the hospital. I struggled to keep up with her. The two men were just entering a door with Bob's limp form as we came up. We followed immediately into a long room filled with rows of white-sheeted cots, some with pale, agonized faces showing from the coverings, others covered entirely.

Joan dashed forward as Bob's form was being laid upon a cot, but two white-capped nurses halted her.

"I'm sorry, Miss," one of them said. "You will

(*Continued on page* 183)

The Ark of the Covenant

by Victor MacClure

When the grey shape filled the field of my gun-sight again, I noticed that the ship floated in a thin pinkish haze that shimmered, as heat from a hillside in summer. And as I pressed the trigger, the dancing refraction spoiled my aim.

The Story Thus Far

New York is startled by a mysterious and daring robbery. Early one morning, everyone in the financial district is put to sleep for two hours by some strange gas let loose, and some unknown and unseen robbers help themselves to millions of dollars of gold and millions in negotiable securities from three banks. The next day the securities are found in the Post Office addressed to several hospitals, and boxes containing millions in radium also consigned to hospitals. James Born, son of the president of the National Metallurgical, one of the invaded banks, decides to investigate the robberies. He finds that the gas has stopped all autos in the invaded district and also had tarnished gold (a feat seemingly impossible). He also finds near the banks a little powdered glass which seemed to be the remains of the containers of the gas. He finds men who noticed a haze in the streets before falling asleep. He takes the matter up with Dan Lamont, a scientist friend, who is trying to discover what gas has been used and how. Several days later comes the news of the robbery of a passing station in Newark of considerable aviation gas and also the invasion of a provisions store with a great amount of provisions taken; but in this case money is left to pay for them. From what Born and Lamont can figure out and from the evidence of a half-drunken employee atop the Metallurgical Building, who claimed to have seen an airship the day of the bank robbery, they believe the bandits came via the air with a new principle airship. Born is by profession an inventor of airplane devices and has constructed a new revolutionary plane the MERLIN, capable of making 550 kilometers an hour. At the request of his father, he goes out over the Atlantic, accompanied by his mechanic, Milliken, and Lamont, to pick up from the PARNASSIC, steaming toward New York, Lord Almeric Plascarden, deputy governor of the Bank of England. They arrive over the ship to find the deck covered with apparently dead men and the ship rolling as though it had no control. They discover, after making a landing on it, that the same bandits had made a raid on the ship by putting everybody to sleep, and stolen from the safe $2,500,000 in gold. Born picks up Lord Almeric and his pretty secretary and mate, Marjorie Torrance, and starts back to the States. On the way back they get a radio message from an oil steamer, stating that all aboard had been put to sleep for two hours (as in all the other case) and the [redacted] rifled of 3,000 litres of aviation gasoline.

CHAPTER VI
Searching the Clouds

WE had left the *Parnassic* at about six o'clock, New York time, with a flight of nearly twelve hundred kilometres before us. Keeping the *Merlin* at a steady four-sixty per hour, we expected to make the Battery soon after half-past eight.

From the bearing which the radio indicator had given us of the *Westbury's* position, Dan and I plotted out her relation to the *Parnassic* at the time of the raid, and found that she had been just over sixty kilometres from the liner. She was probably one of the freighters we had sighted in approaching the *Parnassic*.

Now, the hour given by the *Westbury's* skipper as the time when she was brought to—eight bells in the middle watch, or four o'clock in the morning—revealed the astonishing fact that the raid on the *Parnassic* had been pulled off, sixty kilometres covered, and the oil-tanker stopped, all within an hour. Even at record airship speed, the flight between the two vessels would occupy nearly twenty-five minutes, which left thirty-five in which to board the liner, break open the strong-room and specie boxes, and remove three thousand kilos of gold before casting off. It seemed incredible that one group of pirates could have effected the two operations.

We tried to work out the raids with every conceivable type of craft, taking into consideration the time factors and the six thousand kilos weight of gold and oil that had been carried away. We even tried Dick Schuyler's idea of a motor-ship, giving her the highest known speed for seaborne craft, but we found the thing impossible, despite the fact that we provided her with hydroplane type of power-boats as auxiliaries. We were inevitably brought back to our airship.

When we came to consider what kind of machine would have made possible the whole series of operations—from the gasoline station at Newark, Wall Street, the *Parnassic*, to the descent on the *Westbury*—the weight of the evidence was strongly in favor of

VICTOR MacCLURE

a dirigible of the very latest type; and the abstraction of the gasoline from the Newark station and from the *Westbury* was an additional support to the idea, since an airship carrying out these operations would certainly need to replenish her fuel.

We imagined the pirates operating from a base within a day's flight of New York and, judging from the raid on the *Parnassic*, probably situated over the Canadian border. The weakness of the raider's position in using a dirigible or dirigibles for their operations lay in the conspicuousness of their craft, and of the sheds necessary for docking them. We did not lose sight of the possibility that the pirates might be masquerading as a corporation engagedin civilian transport. A few such companies were in existence, despite the popular prejudice against the so-called "lighter-than-air" machines on account of the structural weaknesses which in the latter seemed to be past curing. But every dirigible that took the air, whether experimental or otherwise, could only do so under permit or license from the government. It would present no great difficulty therefore for the police to run to earth any unregistered airship on American territory.

With the help of Lord Almeric and Miss Torrance, and an occasional word from Milliken, Dan and I decided on a present plan of action. If the raiders had used an airship, they would now be making for their base and could not be far away from us in the air. To escape detection they

IN the present installment, this classic of scientific-aviation stories takes on greater and greater interest and the reader follows breathlessly the wonders of this latter day aviation. The author has a marvelous knack of remaining ahead of you at all times and he is continuously outguessing your own efforts to decide what is going to happen.

None of the scientific instrumentalities which the author brings into this story are either impossible or improbable. Quite the contrary, the latest scientific researches show that the scientific content of Mr. MacClure's story will probably seem quite tame twenty-five years hence.

This Summer we are to witness a great many exhibitions of various monster airships of the lighter-than-air variety and while these airships may not be as perfect as the ones described by the author, we may rest assured that not many years will pass before they have seen such perfection.

→

would probably get to as high an altitude as possible. We determined that, while keeping our course for New York, we would go up in search.

First, we got in touch by radio with Dick Schuyler's headquarters, but while we were asking for him, he himself broke in from another direction.

"I'm just taking a flip out to meet you, Jimmy," he explained cheerfully. "Look out for me soon."

"Have you heard from the *Parnassic*?" I asked him.

"Just got the radio from her captain. The airship notion seems to be all right. Anyhow, we cops are acting on the idea, and are going through our particular sphere with a fine comb. It's a silly question, Jimmy—but you haven't seen any signs of a dirigible, have you?"

"No, I'd have told you——"

"Help us in this. Climb as high as you can without discomfort to your passengers, and keep a sharp lookout. If you see anything, tip me the direction, and we'll be after the jokers like a knife. For the nonce, so-long, Jimmy! Cheerio, Dan!"

Dick's request came on the heels of our own decision. We had already turned on extra heaters and the compressed air, and were climbing good and high. We kept up a bright lookout, but until Dick and his scouts hove in sight below us to the west, the upper air was clear of aircraft.

As we dropped to meet him, Dick began another discussion. He agreed that the likeliest direction in which to look for the raiders was to the northward, and on his order his five scouts made a sweeping movement under our bows to starboard which was pretty to watch. He himself came near enough to us to let us see his cheery grin and to give us a wave of his hand, before turning to follow his scouts. Presently all six were the merest dots on our starboard quarter.

It was worth while carrying a passenger like Miss Torrance. She was keenly alive to everything that was happening, and, like her uncle, took a useful part in the lookout. In fact, she had her eyes so steadily fixed on the upper air that we were in good sight of New York before she realized the landfall.

I will say that her first view of the city was almost worthy of her. I have never seen the old hive look quite so splendid. It was one of those cool bright sunny mornings we sometimes get in March that make everything look so clean.

The pale golden light picked out all the towers and pinnacles of the city in wonderful definition, until they became mere points of light against the smeary blue of the distance. This blue distance rose up and up till it lost itself in the tawny base of the sky, and from that, cloud was piled on cloud in an arch that curved towards us in gold and pale tan and grey, to end in dazzling white against the deep blue right over our heads. The waters of the bay looked in the sun like a filmy grey-green gauze carrying countless spangles, except where the tall buildings threw their long shadows, which were deep indigo with lighter patches of pure cobalt. I think even Lord Almeric was stirred out of his habitual quiet by the sight.

"My dear," he said to his niece, "you are to be envied. New York has summoned all her charm to greet you. In all the years I have known her, she has never seemed so winning."

"Lovely, lovely! See all the buildings like golden cliffs," the girl cried. "So tiny! It makes one think of man as only a very industrious insect—like the weeny things that build the coral islands."

"Then you have to thank Mr. Boon for giving you a god's-eye view of your kind, Kirsteen," said Lord Almeric with a smile.

She turned to me, and looked up, with those serene blue eyes of hers very grave.

"Do you ever develop a godlike indifference to the invisible little active creatures below you, Mr. Boon?"

"No," said I. "I'm afraid I'm always too conscious that I'm just one of them myself, and that my particular activity is only a part of the human scheme, Miss Torrance."

She turned to Milliken with a smile, and his wide grin about split his old face.

"What about you, Mr. Milliken? Do you ever feel superior?"

"Bless you, miss," said Milliken. "I know the old earth's pulling at me all the time, and that sometime I'll have to give in and get down. You can't be a god if your job has a string to it."

"The philosophy of flying in a nutshell, Kirsteen," Lord Almeric laughed.

"I see I must not become imaginative," said Miss Torrance. "Mr. Milliken is braver-minded than you are, Mr. Boon. I'm sure there are moments when he isn't earthbound."

When Milliken goes red, he gets black—if the Irishism can be excused. I have never seen him quite so dusky as he was when he pushed the *Merlin* into the long drive that would bring us into our hover to the landing-stage at the Battery. It was a marvel to me how quickly he and Miss Torrance had understood each other, and I was not a little envious of my mechanic. I'd have given a good deal to have said something that pleased her

Well, anyhow, the god's-eye view soon became the ordinary human view, and we floated gently up to the seaplane jetty just after the quarter to nine. My father had already arrived. In fact, I had seen the *Seven* pass far below us as we came down over Long Island. He was waiting for us on the landing-stage, and he and Lord Almeric shook hands like old friends. There was a trifle of formality to go through with the customs, but that was soon over.

Lord Almeric and Miss Torrance poured thanks on Milliken, who was to take the *Merlin* back to Gardiner Bay, until he was almost ebony colour with embarrassment. Then Dan and I joined the party to go uptown for breakfast.

A Faux Pas

WHILE we waited for Lord Almeric and Miss Torrance to discard their wraps and make themselves comfortable after the flight, Dan and I gave my father a full account of the morning's doings. He already had heard the bare particulars, as supplied to the press by the captain of the *Parnassic*, for the papers were selling in the streets with the news. The full force of the air police, both the sea and land divisions, had been mustered at once to sweep the air in wide radius round New York. The navy and the river police were active among the shipping at sea and in dock. Through the night, the territorial police had been scouring town and country, examining garages and all places

where the thieves might be concealed, and all known criminals in New York of the safe-breaking persuasion had been rounded up and their haunts thoroughly examined. But no clue to the whereabouts of the stolen gold was discovered.

"The chances are that it is in the air at the present moment, dad," I said to him. "We must have passed somewhere near the airship—if airship it was—on the way out. We must have sighted the *Westbury* less than half an hour after the pirates left her. If the airship is making for the American continent at all, it can hardly escape being seen, at least, with all those police machines out."

"Do you think they'll be able to send her down?"

"It depends greatly in what circumstances they come on her. She may be too high to be got at in an open plane, and the police machines are notoriously unsuited for high altitudes. But the fellow that sees her may be able to broadcast her position to all aerodromes, and so get properly equipped planes to help. I won't consider she's escaped until dark has come on."

"Let's hope you prove right," said the old man. "Things are too uneasy to be comfortable, and a solution of the mystery would stave off a lot of trouble for the business world."

Miss Torrance and Lord Almeric joined us then, and we went in to breakfast. The talk, perhaps naturally, was still of the robberies, until the two bankers fell to discussing some obscure financial situation. Lord Almeric, asking his niece for confirmation of some figures, effectually isolated Dan and myself, and it was with something of awe that we heard Miss Torrance talk familiarly of millions, using such phrases as "ranking pari passu," "funded loan," "par of exchange." In spite of her obvious efficiency, the talk fell strangely from the lips of such a pretty girl. I think even my father was surprised.

"You have a wonderful grasp of figures, Miss Torrance," he smiled.

"Wonderful because of my sex, Mr. Boon?"

"Not at all," said my father; "wonderful in any case."

"My niece," Lord Almeric explained, "comes of a stock famous in mathematics. Robert Torrance, the mathematician, was her uncle."

"Then, Miss Torrance," Dan Lamont butted in, "you must be related to—I beg your pardon!"

He broke off in confusion and flushed red. Miss Torrance regarded him with kindness.

"If you intended saying that I must be related to David Torrance, the physicist, who disappeared just over twenty-two years ago," she said, "I am proud to say that he was my father, Mr. Lamont."

"I'm sorry," Dan stammered. "I did not mean to cause you pain."

"You do not hurt me by recalling the fact of my father's disappearance. I never saw him—and he never saw me. I was born after he was lost. Uncle Almeric is the only father I have known—indeed the only parent—and his kindness has softened any regrets I may have for my real father. He was a great physicist, I believe, and I treasure any information about him, any praise that is given to his work."

"David Torrance was a great man," Dan said quietly, with recovered equanimity. "Every scientist owes him a debt of gratitude, and must regret that he was not permitted to work longer. The best men of our time," he finished warmly, "are plodders and half-blind crawlers compared with David Torrance!"

"Thank you, Mr. Lamont," the girl murmured, and her eyes were misty.

"Well spoken, Dan!" said my father, and turned to Lord Almeric and his niece. "Dan Lamont," he explained, "has one of the greatest reputations among physicists in this country—so his opinion on such a subject is of some value."

Red-faced as usual at any reference to his eminence, Dan rose in some confusion.

"If you'll excuse me, Miss Torrance—Lord Almeric," he said hurriedly, "I—I must be going. Some important work—I—good-bye, Miss Torrance—sorry I was clumsy. Good-bye, Lord Almeric——"

"Wait a moment, Dan," said I. "I'll come with you."

I, too, made my adieus, and we both went off.

There was nothing new to hear in Dan's laboratory except a lot that was speculation and clean over my head at that, so I left my friend to take off his jacket and plunge into work. I could see no useful purpose to be served by stopping in New York, and I went down to the Battery where Didcot was still standing by with the *Seven*.

We moored at the workshop jetty within half an hour.

Vanished

THEN began a fortnight of close application to work. The flights we had made on the *Merlin* had given me ideas for slight variations in the design, and I wanted my shops to be set as soon as possible on the task of making a *Merlin II*, which would incorporate those ideas.

My hurry was actuated by the certainty that I had of the raids being carried out with a new type of dirigible. I had that inexplicable feeling, generally termed a hunch, that we had not seen the last of the raiders, and that before we were done with them there would be a few *Merlins* in the air.

I was puzzled by the radium, which the back of my mind refused to let me dissociate from the pirates. If, indeed, those priceless boxes had come from the mysterious organization that had carried out the amazing series of raid in two days, they were no ordinary crooks that we were opposing. The sale of the radium, Dan assured me, would have brought in nearly as much money as the robbers had stolen.

There was something underlying the raids that the mind could not fathom, an idea too big to be merely criminal, too vast in conception to find its limit in the affairs of the past two days.

To me, my side of the job was now plain. The menace was from the air, and the air was my element. I had, I could tell myself without immodesty, the finest weapon for air fighting that was known to exist, and my business was to perfect that weapon to the best of my ability.

To bring the position to its lowest estimate:

If the gifts of radium to the institutions were not the work of the raiders, it was extremely unlikely that a criminal gang, possessed of such powerful and effectively proved aids to plundering, would be content with their present gains. It would be humanly impossible to resist the temptation to work

the feat again. They might wait until the outcry against them died down, till the forces that might be opposed to them were lulled into a false sense of security, but it seemed to me psychologically impossible that a criminal gang could withstand the itch of their fingers for such easily acquired wealth.

In any case, hurrying up my work would do me no harm. My ideas for the improvement of the *Merlin* were concrete enough to warrant pushing ahead. I did not want, for some indefinable reason of sentiment maybe, to part with my original model to the Government. The *Merlin* was almost alive to me, and I knew that Milliken shared the feeling. Besides, in herself she was the most flexible of machines—responsive, grateful to one's hands—just that uncanny accident of assembled material that happens once in a hundred times. Her design might be repeated over and over again to the fraction of a millimetre, and yet no machine be produced that had her personal quality.

The variations in the design which I contemplated were merely to make the machines that might be built from it safer in unskilful hands. The original *Merlin* in the hands of Milliken or myself would be capable of everything that her sister-planes could do.

Before dark that Tuesday night it became plain that no trace of the air pirates would be discovered. The air police abandoned the chase, having combed out a great radius from New York without the slightest result. During the day I had been in radio communication with Dick Schuyler, who kept me well informed, and his last message before he went off from a long spell of duty was that the authorities were taking the tardy step of doubling the patrols for the night.

My father arrived at the workshops soon after seven, and for a while he sat beside me on a high stool as I worked at the drafting table. Thus perched, he told me very calmly of an exhausting day. The run on the banks of the Monday had been repeated on the Tuesday, and there had been the greatest difficulty in meeting the situation. Nothing but selling had gone on in the Stock Exchange and the fall that had ensued in all classes of shares, in some cases reducing quotations by as much as half, had produced a position in the matter of loan accounts unheard of in the history of banking.

"If the government investigators were to examine our books at this moment, Jimmy," said the old man, "they'd find a position of affairs that theoretically could land me in jail. Think of that!"

"I'd rather not think of it, dad," said I. "The thing's quite abnormal, isn't it? It's out of all relation to the actual loss?"

"Of course it is. It's the result of cold feet—don't you call it?—among speculators in the stock markets. Not a few men have been ruined to-day who two or three days ago were worth considerable fortunes. There's nothing more unreasoning than a scared investor or speculator. It's all madness—stark madness! Coming home to dinner?"

"Give me a minute to hand this over to the pattern-maker, and I'll be with you."

We had a quiet dinner together at Hazeldene, and my father approved of my plans.

"I don't see what else you can do, son," said he. "The thing is too big for ordinary detective work I'm convinced you're on the right lines. What about finances?"

"I'm well in funds, dad. That mooring tackle brings in enough in royalties to keep the sheds going full swing, even if they did not pay—which they do. Thank you all the same, dad."

"That's all right, then. I depend on you to play fair and let me stand my share of the expenses. Mind that."

"You shall have the gasoline account, dad," I grinned at him. "I can see old Milliken joy-riding furiously at your expense!"

"Ah!" my father said suddenly. "That's a good man of yours, Jimmy—that Milliken. Lord Almeric and his niece are greatly attracted to him."

"By the by," he went on. "I have asked them both out here for the week-end. I hope you'll be able to show them round your shops?"

"Very glad."

"And perhaps you'll be able to spare a little time from your work to look after Miss Torrance. She is very much a business girl, but I'm sure she'd like to do a theatre or two—something like that."

"When I have the drafting done for the new *Merlin*, I'll be delighted."

"Good. I knew you would. Well, I must do some work, son. Are you going back to the shops?"

"Must, dad," said I. "I want the men to have a clear start in the morning. Good-night, dad. See you at breakfast, I hope. I'm bunking down at the shops, but I'll come over in the morning."

"Half-past eight, then. Good-night, Jimmy."

Next morning, by the time I had breakfast with the old man, I had done enough work to let my fellows get a clean start on laying down the keels of three new *Merlins*. The drafting had taken me and my assistant all night, so when I had driven my father down to the jetty, and had seen him off with Didcot on the *Seven*, I turned in, leaving Milliken in charge of the construction.

I slept until two o'clock in the afternoon, when I was awakened by an S O S through the bank from Sir Peter Weatherly, who had berthed the *Parnassic* in the morning, and wanted the evidence of Dan and myself for the police. It was a nuisance, but there was nothing for it but to take the *Seven* and get to the Battery as soon as I could.

Encountering the Police

I FOUND Dan and the old sailor being badgered into a state of irritation by one of the government investigators, who could not accept the evidence they had given him, but wanted the very things explained that everybody was puzzled about. The pair of them greeted my arrival like a couple of lost pups—they both had that extraordinary likable doggy quality you sometimes see in men—and listened to my evidence with obvious relief. I imagine the investigator had badgered them into thinking my version might possibly contradict their own.

"But it's preposterous!" the investigator cried. "Three sane men can produce only a bare yarn like that!"

"What sort of yarn do you expect us to produce?" I asked. "Of course it's preposterous from start to finish. It's up to you to explain the preposterousness."

The man was rattled. A relic of the bad old days

of the police, he found himself, like the rest of us, against a blank wall, and the fact annoyed him. He banged his fist on the table.

"This is a case of collusion!" he yelled.

"I'll give you one minute to get back your sanity," I told him. "If you can't do it in that time, my friends and I will quit."

"Quit, will you?" he snarled. "If you say another word, I'll have the three of you detained!"

"If you say another word like that," said I, "I'll have you pushed out of the service for the damned fool you are! You get an account of this affair from a man so distinguished at his job that his country gives him one of its highest honours. You get another account from another man, equally distinguished, except for his age, and a man trained in the most exact observation as well. I'll say nothing of myself, finally, except that until now my honesty has never been questioned. And you have the gall to use such a word to us as 'collusion'! As an investigator you're not only crudely impertinent—you're a pitiful vulgar joke!"

"Why—why—you pup! You—you—skinny, mangy pup!" he gasped, livid with rage.

"You're a judge of pups. Maybe the kennel you came out of taught you that," said I, "but it failed to teach you how to investigate! Come on, Sir Peter. Come on, Danny."

There was no attempt to stop us, and we got into the street. Old Sir Peter took hold of my hand and shook it nearly enough to take my arm from its socket.

"I congratulate you, young man!" he cried. "Fifty years at sea, and I never heard a man ticked off like it before! And only one casual cuss-word in the whole recital. That's the wonder of it!"

It was curious how the traditional dread of the shipmaster for the police had got the better of the dignified commander of the great liner, and had reverted Sir Peter back to the innocent seadog, putting him at the mercy of a common bully. But by the time we had adjourned to the smoke-room of a neighboring hotel the sailor was himself again.

"I won't forget that, Mr. Boon," he said. "That fellow had got me so flummoxed that I thought I had been in league with the pirates."

"You ought not to have gone to the Police Bureau at all, Sir Peter," I told him. "You should have received all inquiries on your own deck."

"I wish I had," he breathed. "I'm at home there—and even my King, bless him, couldn't order me about!"

I was mad at the treatment of my friends, and we went to the hotel stenographer, who took down a letter to the Chief of Police, in which I explained that Sir Peter and Dan had been treated with extreme discourtesy, and that apologies were due to them. They got letters of apology next morning.

The incident, however, was symptomatic of the exasperation and bewilderment the authorities were experiencing. The newspapers came out with the most wonderful theories, interesting enough to read, but not the least helpful to those whose job it was to solve the problem of the raids. The country was gone over, as it were, with a fine sieve, without the slightest result. The land and air police were bitterly attacked by the press, and even the naval and military authorities came in for condemnation. As time went on the old ground had been turned over and the old facts redressed so often that the public got sick of the affair, and skipped any items in the papers that referred to the raids. But business confidence remained badly shaken.

Dan Lamont's investigations of the gold tarnishing resulted in his finding compounds of copper, and a hint of some radio-activity. This seemed to me absurd, but it fired Danny's enthusiasm, since he thought it indicated that the raiders had discovered some enlargement of the science of radio-activity as applied to the atomic theory. He had the terrier's tenacity, and he went after the thing from every possible angle, worrying the facts and himself until he developed between his eyes a permanent furrow of concentration. He bored after an explanation of the mysterious sleep, too, and discovered at least one gas which, if not lethal in its effect, was tremendously anaesthetizing in so far as it stunned the olfactory senses. Properly, it might have been called a lachrymatory gas, for its effect on the nose made the eyes stream!

The work on the three *Merlins*, meantime, progressed rapidly at the workshops near Gardiner Bay, and I had time to devote to social obligations. Dan and I dined two or three times with Lord Almeric and Miss Torrance, and we all had a golfing-flying party at Hazeldene during a week-end. The workshops were inspected thoroughly, and Milliken and Miss Torrance formed a curious compact of friendship that had the effect of making my mechanic go about with a ready grin on his normally formidable countenance. She petted him shamefully, and even flattered him into letting her take the joy-stick of his beloved *Merlin*. Nobody could blame Milliken for being enslaved—Miss Torrance had a way of deserving any little service one might do for her. Hazeldene and the workshops were dull places for quite a while after she went back to New York on the Monday.

Louisville Next!

THE establishment at Gardiner Bay was not a large one, but it was fairly well equipped. It had a small foundry where we did all the castings for the wings and body-work of our planes and, of course, we had a moulding shed. There was a smithy with a good welding plant, drawing-office, pattern-maker's shop, fitting shop, and in addition to our mooring-shed and landing-stage, we had a large field for landing with a one-bay hangar.

The only part of the work we did not do ourselves was the building of our engines. These came from a little-known factory in which I had an interest near Pittsburgh. Its products were reliable to a degree, and beautifully finished, developing a great horse-power in ratio to their weight. We seated these engines ourselves on the machines we constructed, and we had our own notions of fuel supply and cooling system.

With this small establishment working at top speed, we were able to have three *Merlins* lying in the fitting shop awaiting their engines by the Wednesday of the second week after the Wall Street affair. This last piece of assembling had to wait. It was all to our advantage that our power-units should undergo the very strict tests that the factory at Pittsburgh considered necessary before passing out any engine.

There was one thing that made the enforced wait easier to bear. I had more time to spend with Lord Almeric and his niece. Their visit to New York was nearing its end, for Lord Almeric had almost finished the work that had brought him to America. Only a matter of business with the Treasury in Washington remained to be seen to before he returned to England. Miss Torrance, it appeared, was taking advantage of the trip to spend some months in Washington with relatives there, a piece of news that seemed pretty good to me. It sounded such a waste of time for a girl like her to come to America for a fortnight. Washington was less than an hour away for a machine like my *Merlin*.

We were having dinner together on the Saturday evening before going to a theatre. My father was there, Lord Almeric of course, Dan Lamont, and Miss Torrance. I was telling her how easy it would be for me or Milliken to run down to Washington and take her back again if she wanted even a day in New York. She laughed at me.

"There doesn't seem any end to your American hospitality," she said. "Does there, uncle?"

"American hospitality," said Lord Almeric, "is the only thing known to work more than twenty-four hours a day."

"No, but seriously, Miss Torrance," I insisted. "I think it would be a real good plan just to wire me if you wanted to come to New York. 'Boon, Gardiner, L. I.: Plane wanted. Torrance.'—just that, and within an hour Milliken, or I, or Didcot would be fluttering down on the Potomac."

"As easy as that?"

"As easy as that," said I. "And to show you how easy it is, I'm going to ask Lord Almeric to let me carry you both to Washington to-morrow. May I, Lord Almeric?"

"My dear Mr. Boon—you must not make us impose on your good nature!"

But I had my way. At seven o'clock on the Sunday evening, Milliken and myself took off from the Battery in the *Merlin* with Lord Almeric and Miss Torrance, and some of their luggage. Soon after half-past seven, in the first-creep of dusk, we sighted the pale lights of the aerodrome and seaplane basin on the Potomac, and by twenty to eight we had landed our passengers.

"Don't forget, Miss Torrance, that there will always be a bus at your disposal whenever you want to come to New York," I said.

"I won't forget, Mr. Boon. Good-bye, and my grateful thanks for many kindnesses," she said. "Good-bye, Mr. Milliken! Remember that you're to coach me for my pilot's certificate."

Milliken grinned that big grin of his.

"I'll remember, Miss Torrance," he said. "It won't take you long."

"Good-bye, Mr. Boon," said Lord Almeric. "I shall see you on my return to New York. Good-bye, Milliken. Best wishes for the success of your new machines."

They stepped into a government automobile that was waiting for them, and drove off.

Funny how Milliken sizes people up. I never thought of that, and I sort of kicked myself for having so blatantly offered the use of a bus.

"Dad fetch it, Milliken!" I grumbled. "What's the good of making friends only to lose them? I don't even know her address. It seemed inquisitive to ask."

"That's all right, Mr. Boon," said Milliken cheerfully. "She's a niece of the President. Everybody knows his telephone number."

"The White House! How did you know?"

"She told me coming along. I have to send her a copy of your book on flying."

"Why didn't she ask me for one? I'd have had one specially bound for her——"

Milliken looked at me queerly.

"Maybe that's why she asked me to get her one, Mr. Boon. She's a very independent young lady."

We locked the *Merlin* up in a private shed. It was the only way I could induce my mechanic to leave her and come with me to an hotel, though the machine was fully protected in the matter of patents. After dinner we both went along to look up a man in the Air Department, and spent the remainder of the evening talking shop. We got back to our hotel at a late hour and went to bed.

I was awakened at eight o'clock in the morning by a negro bell-hop bringing me a cup of tea.

"Papeh, suh?" he said. "They's bin anuthuh of them bank robbin' businesses down at Louahville, suh—ina home town as wuz. Them robbers is shoh the piratinest white men ah evah see——"

He handed me an extra edition that still smelled of wet printing ink, and across the front page in staring letters ran this announcement:

"THE 'PARNASSIC' TRICK PULLED ON LOUISVILLE!
Town Put to Sleep While Four Banks Are Robbed!—Mysterious Radium Gifts Appear Again."

I jumped out of bed and ran into Milliken's room.

"Milliken! Milliken! The raiders have been at it again down at Louisville this morning!"

Milliken, who was shaving himself with an old-fashioned razor, turned and looked at me calmly.

"Gracious Jinks!" he said—and went on shaving.

CHAPTER VII
To Louisville

FOR a space I gazed at my mechanic in silence, and nothing was to be heard but the whisper of the razor on his stubby beard. He wiped the soap from the blade and turned.

"When do we start for Louisville?" he asked.

"As soon as we have had breakfast," I said as casually—he was not going to pull off any quiet surprise on me.

We were down at the seaplane-basin by nine and after filling the *Merlin's* tanks took off just after the hour. We gave her plenty of gas and covered the eight hundred kilometres to Louisville in an hour and forty minutes.

It was useless attempting to get near the robbed banks, for the streets were thronged with people, packed tight and deep. I went right to the headquarters of the air police, where there was a chance that I might be known, and was lucky enough to find the local commander an enthusiastic supporter of the Aeronautical Research Society, of which I was an office-holder.

The raid on Louisville was simply the Wall Street and Newark affair on a smaller scale. The sleep had come upon the police and the watchmen at two o'clock in the morning, and the strong-rooms of the banks had been cut open by the same means as that used in New

York. Gold to the amount of a million dollars had been taken from the four banks, with securities to an amount not stated, but these last had been found at the Post Office in two envelopes addressed to local hospitals. The hospitals also were the recipients of a box of radium each, smaller than, but otherwise identical with, those left in the New York Post Office.

The robbed banks might roughly be put in groups of two: the National Bank of Kentucky and the Fidelity and Columbia Trust in Main Street, and the Citizens'-Union National and the Louisville Trust in Fifth Street. It might have been possible for the raiders to have effected their anaesthetizing with two bombs such as I had imagined had been dropped in New York, but though I looked for the smears of glass as best I could in the dense crowd, I was disappointed.

A feature of this raid was that the Post Office had been affected by the anaesthetic, doubtless because it stood across the way in Fourth Street from a large grocery establishment from which a quantity of comestibles has been abstracted. In this food-store, Messrs. Shapp & Zort, money had been left to pay for the goods as in the case of Schomberg's in Newark.

When we arrived, the news had just come through that a gasoline container down the Ohio to the west was showing a deficiency of fifteen hundred litres of aviation spirit. The sequence of coincidence was complete.

"Can you give me any information about the street cars that were running at the time of the raid?" I asked the air police commander.

"There are not many cars run on Sunday evening, but the few that were out were stopped—notably one down Fourth Street to the levee," he replied. "The driver in falling took his hand off the safety lever, which of course automatically brought the car to a standstill."

"What about any automobiles?"

"We can only find three that were in the affected districts, and they seem to have been stopped in some way quite unfathomable."

"What sort of patrols had you up at the time, commander?"

"Only one scout, who had been out towards the Cumberlands on patrol during the time of the raid. He came back in the ordinary way at half-past four, having seen nothing to report. In fact, he was filling in his sheet when the news came of the robberies. I immediately called out the other scouts, and three of them went up. I then radioed the news to all stations—a general call—but so far there is no trace of the raiders."

"Could you find me some one who was doped?" I asked him.

"I think I could put my hand on a land cop," he said.

We went to the police station and found a man who had been on duty in the affected area during the night. His story was exactly similar to that of my New York friend, McGrath—no noise to startle, nor any smell—there might have been a faint luminosity, he couldn't say.

"Had you any gold about you while you were on duty?" I asked him.

"I have an old gold dollar I keep in my ticket pocket for luck," he said. "Why, sir?"

"Would you mind letting me see it?"

He went over to the side of the cot on which he had been lying when we entered the station dormitory, and took the dollar out of the little pocket in front of his tunic.

"Well, I'm durned!" he exclaimed. "The thing's gone rusty!"

"I expected it would be," said I. "Thanks very much."

My commander friend was rather astonished at what he thought was acumen on my part, and as we went down to the levee, I told him a few facts about the New York raid.

"This is a big thing, Mr. Boon," he remarked as we stepped out on the levee. "It's a national affair——"

I answered without much thought.

"I shouldn't be surprised if it became an international affair."

"International—hey?" He broke off as he saw the *Merlin*. "Say, Mr. Boon, is that your plane?"

"That's her. My latest model, the *Merlin*," said I, with some pride.

"She's the prettiest thing—and looks fast."

"She is fast. Fast as lightning." And I told him about her.

"Well, Mr. Boon," he said. "Hurry up and sell a copy or two to the air police. If all you think about these pirates is true, we can do with a few like her."

After a close inspection of the plane, we said good-bye, and Milliken and I took off up the river, heading for Pittsburgh. We wanted to see about our new engines.

It was one o'clock when we left Louisville and we made the suburb of the steel town shortly after two.

While we inspected the engines, a boy was sent out to bring us in a quick lunch, which Milliken and I ate as we made our inspection. The engines were splendid, and the charts of their tests showed a wide margin of efficiency. They were ready to be crated for their journey. I got an idea, and turned to Milliken.

"Say, Milliken," I said, "why don't we——"

"—take them with us," he finished with a grin. "I was just thinking what a pity it was to leave them to the mercy of the railroads."

"Can she do it?"

"Can she do it!" Milliken repeated scornfully. "Huh!"

The job presented no great difficulty. We unshipped the limousine top of the *Merlin*, then laid stout battens across the floor of the cabin. The three engines were brought, one after the other, on a traveling crane into the boat-shed, and were lowered into the open cabin. To preserve our flying balance, we had to bring them forward almost up against the pilot's seat. The job was over and the top replaced by four o'clock, and we set off for Long Island, six hundred kilometres away.

A Serious Conference

As we passed over the northern spurs of the Alleghanies, dotted with little towns and hamlets, it seemed to me, with all my thoughts on the raids, that it was not beyond possibility that a camouflaged airship shed could be concealed among their woods and valleys. There were spaces wide enough, sparsely inhabited, where the secrecy of such a base could be preserved for a good length of time, sufficient—except for accident, at any rate—to enable the raiders to carry out quite a number of operations before making their get-away.

Remembering the wide areas of thinly populated land in this modern America, even within a few hours' striking distance of the crowded Eastern states, it came to me that the hunt for the lair of the marauders

could easily be a long one. It was amazing to think that the airship could so easily descend on a town without observation and vanish, so to speak, in thin air. In none of the raids so far had there been any reliable story of the vessel having been seen—except for the dream of the besotted Finn, Klenski. There had been the usual crop of lies, fantastic enough to defeat themselves, but the clear, unstrained evidence of the credible witness was lacking.

Although none of the raids had been attended by loss of life, there was something terrible in the silent approach in the middle of the night, the uncanny power of robbing all waking folks of consciousness, in the rapid operations in the dead quiet, and in the stealthy retreat when the work was done. It did not need the recollection of the first sight of the helpless *Parnassic* to make one's hair prickle at the thought of the marvelous potency in the hands of creatures more definitely malign than the raiders had shown themselves.

As I thought of these things, a whimsical notion came to me, and I turned to Milliken.

"I wonder if they use the Boon double silencer?" I said.

"Shouldn't be surprised," he returned, picking up my thought with that queer quickness of his. "There was a mechanic down at the Louisville levee who had been awake all night. He never heard the slightest hum."

"Was he out of doors during the time of the raid at all?"

"Yes."

"And saw nothing?"

"Not a thing."

"Did you ask him if he looked up at the sky?"

"No, I didn't bother. He was an air mechanic, I tell you."

I had to grin at Milliken's sparing way of making enquiries. He knew too well that an air mechanic would be sure to glance up at the wind indicator, and every now and then look for any change in the weather.

"Funny thing if they're using my silencer," I said.

"Huh!" said Milliken, and I had to guess whether he agreed or otherwise with my sense of the curious.

We made Gardiner Bay before six o'clock, and turned all hands on to unloading the new engines. We shunted them through the sheds on the overhead electro-magnets, and deposited them, each to its own bed, on the new planes ready for fitting. Milliken was not content until he had the propeller and the engine cap fixed on one of the buses, just to get an idea of the general effect.

"Pretty," he said grudgingly, "quite pretty. I'm glad we gave them green bands, though. Wouldn't like the old girl to see them making free with her own particular blue!"

"Say, Milliken," I protested, "don't get absolutely stuck on the old girl, as you call her. We're going to design even a better bus yet."

He looked at me pityingly.

"Some people," he remarked in a general sort of way, "are like Julius Cæsar. They keep on bein' ambitious till it busts them!"

"That," I reminded him cruelly, "was pretty much what you said when I first suggested the *Merlin* to you."

"Aw, well," said he, with a half-ashamed grin, "the *Merlin's* a peach." Then he broke off thankfully. "Here's your dad on the *Seven*."

We went down to the jetty as the *Seven* was brought to, and to my surprise the first person to step ashore was not my father, but Lord Almeric Pluscarden.

"Hullo, Lord Almeric!" I said. "Thought you were in Washington?"

"I have been in Washington," he smiled, "but I have had to come back in a hurry. Your father kindly sent the seaplane for me."

"Hullo, Jummy!" my father broke in. "Been to Louisville?"

I nodded.

"I thought you'd go. Come along home to dinner. Lord Almeric and I have something to discuss with you."

The three of us got into the roadster, and soon were sitting down to dinner at Hazeldene. There was a touch of gravity in both my father and Lord Almeric, though they spoke without restraint, discussing the Louisville affair very keenly.

"The radium settles it," said my father. "We're up against no ordinary crooks."

"It's a big thing," I agreed.

"There's some idea underlying the whole series," said Lord Almeric. "It is hopeless for your press to attribute it all to a revival of the I. W. W. idea. Men who give gifts of radium to hospitals and research institutes are hardly of that kidney."

"No," said my father.

"What would you say was the notion back of it all?" I asked them.

"Heaven alone knows!" the old man burst out. "It could not have come at a more awkward time. We have enough on our hands already—eh, Lord Almeric?"

"Truly." Lord Almeric nodded gravely.

"I had better take my son into our confidence, my lord," the old man said formally.

"I agree. It would be better."

Trouble Brewing

THE old man turned to me and gave me a keen look.

"Jimmy," he said quietly, "Lord Almeric will agree with me that the world is ready to seethe over. Unless we can pull back in time, we will be in a world war again. Let me show you our situation here. Japan, over-populated in the most appalling fashion, is knocking at our door insistently, wanting some of our room. The British dominions are closed to the yellow immigrant, and Japan is prevented by the world from getting all she wants in Siberia and China. That pot is ready to boil over.

"Take the European situation. There is Germany snarling over new Russia like a dog with a bone, and—your pardon, Lord Almeric——"

"Not at all, Boon," said Lord Almeric. "And Britain—ah—Jimmy, if I may take the privilege—Britain ready to fly at Germany's throat because the bone is a particularly juicy one."

"Poland, too," my father went on, "betrayed for the second time in history by the European powers—and by America, who ought to have known better. France, again, hardly mended yet from the devastation of '14-18, naturally sick at seeing a country in her debt forging ahead of her, ready to take up the sword against her old enemy. Then there's that hotbed of swaggering, clashing nationalities, the Balkans, each new state more bumptious and aggressive than the other. I tell you, Jimmy, if any lesson came out of that war, where you fought, and which cost so much in treasure and blood simply chucked away, the world has forgotten it."

"Why on earth can't they all settle down with what they've got and do a bit of work?" I asked. "What's at the root of it all?"

"What is the root of all evil, Jimmy?" said Lord Almeric.

"That's it," said my father. "Money. Each nation thinks the other is making more than itself, and that without working for it. The great cry is 'unfair competition'! If one nation has the wit to think ahead, to take the right line of development to meet a coming need in commerce, its neighbor yells, 'Unfair competition!'"

"I know little of things international," said I to Lord Almeric, "except concerning my own line. I hope there's no chance of a row between your country and ours, sir?"

"No, thank God. There's that comfortable streak in us both that makes us admire a successful rival in trade rather than immediately want to cut his throat. The shopkeeping instinct, if you like—but of value to our sense of proportion. But we may find ourselves on opposite sides, willy-nilly, if some of the hot-heads come to blows. If America had to take a firm hand with Japan, what could Britain do? If she sided with Japan, she would alienate her overseas dominions, who will not have the Jap on any consideration. If we in Britain supported America, we should endanger large financial interests we have in the East. We should lay our Eastern possessions at the mercy of the yellow people, for new China would be dragged in. It is an exceedingly complex situation, Jimmy, and not one that can be threshed out after dinner."

"Let me accept it as threshed out," said I. "Where do you, Lord Almeric, and dad come into it?"

"On the money side," said the old man. "There's lots of them that would like to fight, but they can't do it without money. And there are numbers of people asking for loans at the moment, ostensibly for development work. We have to go very carefully. Lord Almeric's mission in America has been for the formation of an understanding between Britain and our people as to how far we may go in this or that direction. In our discussions—between an American group of financial firms and banks and an English group, as represented by Lord Almeric—we have come upon a new situation that may well upset the whole arrangement. It may lead us into a big war, nominally through one with Japan."

"Good Lord!"

"Now, Lord Almeric has to get to London in quick time, to put the case before his people. There can be no question of cabling it. We did not want you to work in the dark——"

"I don't mind working in the dark, dad. You want me to get Lord Almeric to England?"

"You've got it, Jimmy. I have pledged Lord Almeric my word that you will get him to London by some means or other by Saturday."

"I wondered if you could put me aboard some ship reaching Southampton on Friday morning," said Lord Almeric. "I am ashamed to throw myself into your hands so helplessly—but your father insisted."

"Dad was quite right, Lord Almeric," said I. "You'd be leaning on a broken reed to try the Transatlantic Aviation. Their weekly plane doesn't leave until Friday morning, and it would be the early hours of Monday morning before you reached London. Clumsy brute! —for all its four engines!"

"I thought perhaps you could overtake the *Thessalic* or the *Parthalia*," said his lordship.

"Let me see" I searched for a shipping list.

"The *Thessalic* sailed on Friday night, and is due to reach Southampton next Friday morning. The *Parthalia* left last night, Sunday, and reaches Southampton next Sunday morning, so she washes out.

"Suppose we started to-morrow. The *Thessalic* will be over three days out, more when we reach her. Lord! She'll be well over three thousand kilometres out when we overtake her! I might as well fly you all the way, sir."

"But surely that would be unnecessary—I could not think——"

"Don't you see, sir? The whole distance is under six thousand kilometres. I should have to fly about seven thousand on the double journey to the ship and back. I had better fly you the whole way. It will give me time to put the *Merlin* in first-class order, anyhow. I'll have to ship new tanks for extra oil and gasoline."

"Will the *Merlin* do it?" the old man asked.

"You bet you, dad. In thirteen hours. We leave here on Thursday evening before dinner, and we reach Battersea aerodrome at one o'clock on Friday, allowing for the difference in time. How will that do, Lord Almeric?"

"Splendid! I cannot find words to thank you, Jimmy —or you, Boon—you overwhelm me with kindness——"

"We won't say anything about that," said my father gruffly. "Will we, son?"

"Surely not," said I. "I'll be glad to give the *Merlin* such a good test. All you have to do, Lord Almeric, is to regard yourself as so much make-weight cargo."

"Heaven forbid!" Lord Almeric laughed. "You might find it necessary to jettison me!"

"I'd jettison the *Merlin* first!" I blundered, reddening at my apparent rudeness to a man so courteous.

"Heaven forbid that, too!" said Lord Almeric. "The sea police might arrest us in midair for having no visible means of support!"

He put an arm on my shoulder and we went to the billiard room, where his lordship conscientiously collected a nice selection of the Boon dollars by thoroughly beating my dad and me at pool and snooker. I went to bed early, for I intended to get some work done before breakfast, and left my elders trying trick shots.

I was just dropping off to sleep when my father came into my room.

"Hullo, dad!" I said. "What's the matter?"

"Nothing much—just wanted to say good-night, son."

"Good-night, dad——"

"You know, Jimmy," he said slowly, "I'm tickled to death with my own son——"

"That's funny, dad," I sat up to say. "I was just thinking I was sort of proud of my own father."

"Oh!" said he. "Well—good-night, Jimmy."

"Good-night, dad"

Across the Atlantic

THE next two days were spent in fixing the engines in the new *Merlin* and in making tests of them. Milliken and I were in the air a good deal, trying all sorts of fool tricks to prove the design no good, but we could find no fault in it. We had a winner, all right.

In the meantime, the old *Merlin* was being tuned up —not that she needed much tuning—and the work of putting in the extra tanks for the Atlantic flight went ahead.

Lord Almeric's luggage was brought over by Didcot

on the *Seven*, and everything was put in order. We rigged up a pair of collapsible bunks from the side walls of the cabin, so that our passenger could sleep if he wanted to, and so that Milliken and I could lie down in our off spells. Then we had a little vacuum-box for hot food, and everything necessary for feeding in comfort.

At seven o'clock on the Thursday evening, we said good-bye to my father and Dan Lamont, who had come over to see us off, and to a great "Rah-rah!" from the staff of the workshops, we shot off across the bay, the *Merlin* quietly picking up into her cruising speed of four-fifty kilometres an hour.

The weather report had given warning of low storms off the coast, and we climbed high to ride over them, so there was not much to see below us. At three thousand odd metres up, we came into a side wind from the north, fairly strong, which must have given us a lot of drift. But the *Merlin* was flying easy, and there was no pitching to speak of.

Milliken relieved me at eight, and I joined Lord Almeric in some food, for we had not dined before leaving. He was a charming companion, who talked interestingly, and had the knack of making one talk as well. It seemed that there were few corners of the earth he had not visited, and his outlook on life was correspondingly wide. There was nothing insular about him. With his open collar and its old-fashioned broad silk cravat, of the shape the English call "Ascot," he looked what he was, a very distinguished Englishman of the best type, but the curious thing was that he appeared as much at home in the cabin of the *Merlin* as he would have been in his own library.

When I spelled Milliken so that he could have something to eat, Lord Almeric continued his talk with him, charming my mechanic into an unwonted loquacity. It was gently done, and it had its reward, for Milliken when he did talk talked very much to the purpose. Over my shoulder I heard more of Milliken's life laid bare to Lord Almeric in half an hour, than I had got from the mechanic in the years we had been working together.

"Now, if you'll excuse me, sir," I heard Milliken say, by and by, "I'll just chuck some of this stuff overboard and wash up."

"Let me bear a hand," said Lord Almeric. "You wash and I'll wipe!"

"If it comes to that, sir," said Milliken, "you wash and I'll wipe. I know better than you do where to stow."

"Good. This the grease remover?" Lord Almeric had taken off his jacket.

"That's the stuff, sir. And here's a dish-cloth."

A rush of cold air at this moment made me turn round. Milliken had pried up the hatch with a fork through the ring, and was scraping the refuse through the opening.

"All the world is my garbage can, which with this fork I will open," Lord Almeric laughed.

"Ah," said Milliken. "That's old Pistol, isn't it?"

"Slightly amended——"

They fell to discussing Shakespeare, and by the time they had finished their chores and were lying down on the bunks on the opposite sides of the gangway, they were pooh-poohing the Bacon-Shakespeare theory. They then fell to talking of dry-points and etchings. I could not help thinking the subjects curious common ground for a great banker and a fine mechanic to meet on.

Milliken relieved me at midnight, our time, and I took my turn on the bunk.

"Where are we now, Jimmy?" asked Lord Almeric sleepily.

"Just clearing the Newfoundland Bank, we should be—four hundred odd kilometres west, a point or two south of Cape Race."

"Splendid!" murmured his lordship and fell asleep, an example I proceeded to follow.

It was bright day when I woke to relieve Milliken, four o'clock by our timepiece, and about seven in the longitude we were passing.

"Passed the *Parthalia* about fifteen minutes back," said Milliken. "I'd say a hundred kilometres to the north."

"Then we've drifted a bit, but not so much as I expected."

"Ah-hah!" he yawned. "Wind shifted round about two—blew us back again."

He fetched me a cup of coffee, and then turned in.

Two hours later Ireland came up like a smudge of blue smoke on the horizon to port, and a few minutes later the Lizard widened out into the spear-head of Cornwall and Devon.

I can never fly high over England. I love to see the patchwork of fields, the dark purple of her woods, and the tiny white ribbons of her roads, the slender threads of silver that mark her waterways. I had to come down close enough to get the shape of her red roofs, all the jolly, homey villages, nestling in wooded hollows or sprawled over low downs, each with its church spire or tower rising from a patch of green, green sward, white speckled with the headstone above her ancient dead. It was April in England then.

A Night in London

THERE was no time to saunter, but I wanted to. We had to get our passenger into London by one o'clock, English time. Lord Almeric was astir, and had made an astonishingly neat toilet. He was drinking coffee.

"This is the first time I have been robbed of five hours in a day," he said. "I am certain I shall order eggs and bacon at lunch from force of habit."

Big Ben on Parliament House chimed out the quarter to one as we dropped into the basin at Battersea, and before he spoke again at the hour, we were stepping into the taxi that was to take us to Lord Almeric's house in Knightsbridge. But I don't think that Milliken was very easy in his mind that the *Merlin* was safe even in the lock-up shed in which she was berthed.

Lord Almeric would not hear of either Milliken or myself going to an hotel. He insisted that we make his house our own. Milliken tried hard to refuse, but his lordship effectually stopped all protest. He led us to a little nest of rooms, not separate from the house, but somehow possessing an individuality—if one may use the word—of their own. He opened the door of a tidy, mannish sitting-room.

"I had a boy at one time, Jimmy," he said quietly. "He was killed at Mesines. These are his rooms—just as they used to be when he lived in them. Nothing has been touched, though my servants keep them warmed and aired. There are two bedrooms and a bathroom—through there—and another living-room. I have had them made ready for you both. I shall be very, very glad if you and Milliken will occupy them while you remain in London."

I heard a joint in Milliken's hand crack softly as his

fist clenched.

"My only fear is that I shall be a poor host," Lord Almeric went on. "My time will be much occupied, as you will understand, Jimmy—in fact, I must be back in harness at once. I have a conference in the City at three, and other in Westminster at six. I question if I shall be back until late at night. My people will attend to all your wants, and will serve your meals here. If you should think of going to a theatre, I'm certain that Milliken would like the production of 'Twelfth Night' at the Haymarket. Bunter, my butler, will get tickets for you. Now I must go. Pray excuse me. I shall hope to see you to-night."

He went out, leaving us there. Milliken and I looked at each other in silence for a space.

"I didn't want to stop in his lordship's house, Mr. Boon," Milliken said slowly. "But when he asks us to use his dead boy's rooms, he gives me the one thing I couldn't refuse. It must mean a lot to him—this."

"You bet you, Milliken."

"And I thought lords and such-like all bunk! That one," he nodded to the closed door— "that one makes me see I've been a fool!"

We bathed and changed, and lunch was brought to us in another of the rooms. The butler appeared to see if we were all right, and we let him get tickets for us.

"Can you tell me," I asked him, "where I might find files of the London daily papers for a week or two past?"

"In the small library downstairs, sir. We keep files of the *Times*, *Morning Post*, and *Telegraph* and of a number of the financial journals. May I show you the room, sir?"

"Please."

I found that the London press had treated the New York raids in daily reports that never got over half a column. The *Parnassic* had the honor of a full column on the first day, and dwindled to half a column on the next, while the *Westbury* was squeezed into twelve lines. Louisville was almost crowded out by two pages of parliamentary crisis, and a long murder trial. That which had taken all America by the ears, seemed to matter little in England. It was, according to a note in the *Times*, purely an American concern.

We saw nothing of Lord Almeric until late at night, when we found him waiting for us to arrive from the theatre. We sat for an hour or two round the fire in his sitting-room, yarning, and drinking some of the best whiskey I have ever tasted. It must have been close on one o'clock in the morning when we went to bed.

CHAPTER VIII
A Raid on London

SOMEWHERE in the house a telephone bell was ringing insistently. It rang in long peals, and just when I would think it had stopped for good it would begin again, more furiously than ever. I put my hand under my pillow for my watch, then switched on the light over my head. It was half-past three. The bell still shrilled through the house. Then came the sound of a door opening, and the bell was stopped by the murmur of a voice. Presently came the shuffling of feet, and somewhere nearer at hand another voice took up the murmuring. There was silence again. Firm footsteps now came masterfully to my door, and a knock.

"Yes. Come in!" I cried.

The handle turned, and Lord Almeric entered, wrapped in a dressing-robe.

"Something has happened at the Bank," he said.

"Good Heavens, sir!" I exclaimed. "You don't think——?"

"I'm inclined to think it is—our friends of the *Parnassic*—or others of the tribe."

"But—but in London! It's incredible, sir!"

"We live in an incredible age, Jimmy. Would you like to come with me to the City? I'm going there at once."

"Sure, I'll come," said I, and jumped out of bed.

While I was dressing (Lord Almeric had gone off to give orders for his car, and to dress) Milliken appeared in my doorway.

"Anything the matter, Mr. Boon?" he asked.

I told him.

"Jinks!" he said. "Want me with you?"

"Not unless you're keen to come——"

"I'm not," said he shortly.

"Very well, then. If I don't get back by breakfast time, go over to Battersea by yourself. Hire what mechanics you want for the *Merlin*, and get her overhauled. Have you any British money?"

"Oh, yes. Didcot changed a hundred dollars for me in New York. Is it two and a half of these florin things to the dollar?"

"As near as doesn't matter. Two florins and eight pennies are more like the sum."

"All right. I'll get back to bed."

And he did, with no further comment.

There was little stir about the streets as we sped Citywards, except for great trucks of fruit and vegetables, the big horses, pulling them, plodding along sagaciously with little or no guidance from drowsy or even sleeping drivers. The asphalted streets were wet from recent washing, and here and there we came upon sweeping machines with their wide rotary brushes working anglewise to the gutters. Now and then we would pass a solitary policeman, or a pair of them, their rubber capes glistening under the street lamps. Even this slight activity slackened by the time we reached the Strand. Then we came to Fleet Street, where the newspaper offices were ablaze with light.

"They have not received the news yet," Lord Almeric said softly. "If they had you would see the reporters streaking towards St. Paul's like hornets from a nest."

We whizzed up Ludgate Hill and passed under the shadow of St. Paul's. The City was like a place of the dead.

"It looks like the stillness of an actual raid, Lord Almeric," I whispered.

"Yes—but the City is always like this at night. Thronged during the day, and a jam of traffic—but like Herculaneum for stillness after eight o'clock."

At the corner of the Mansion House, a policeman stopped the car and peered in at us, flashing his torch. When he saw Lord Almeric he saluted and waved us on. Policemen were streaming into the open space in front of the Royal Exchange. We pulled up outside the Bank of England, and a policeman opened the door of the automobile. A white-faced inspector met us inside the building, and he was immediately joined by a subaltern of one of His Majesty's Footguards—the Coldstream, I think it was. This officer was as white-faced as the policeman, but keeping a stiff upper lip in spite of his obvious misery.

"This is a bad business, my lord," said the inspector.

"The Bank of England robbed!"

Lord Almeric nodded and turned to the young guardsman.

"You're Guy Pennefether, aren't you?" he asked.

"Yes, Lord Almeric."

"Permit me to introduce a friend of mine, Mr. James Boon. Mr. Guy Pennefether—Inspector Trueman. Now, let us go to your quarters, Pennefether. You'll come also, inspector. You shall tell me quietly what has happened, then we shall inspect the damage."

The Guardsman's Tale

"THERE isn't much to tell, Lord Almeric," said the young fellow, when we had reached one of the rooms occupied by the officers of the nightly guard. This was a neat little mahogany-panelled dining-room in the heart of the building.

"Sit down, Pennefether, and compose yourself," Lord Almeric said kindly. "You, too, inspector. I don't wonder you are shaken. Jimmy, find a seat for yourself, please."

I took a chair near the table that stood in the middle of the room.

"Now, Mr. Pennefether."

"I haven't much to say, Lord Almeric. We took over at the usual time. The sentries were mounted in the usual way, inspected, changed, all according to orders. Nothing unusual happened until half-past midnight, when my sergeant came into the room here with me after doing the rounds. I had asked him something about one of the men in my platoon—as a matter of fact it was about his chance of winning the cruiser-weight championship of the brigade—when suddenly Sergeant Withers stopped speaking. 'What's the matter, Withers?' I said. He blinked at me. 'Nothing, sir, nothing,' he said; 'something passed over me—queerlike.' Then something queer told hold of me. I began to see the sergeant as through a haze. He got further and further away, his voice becoming fainter—then he seemed to crumple up—like a concertina. I don't remember anything more . . . until I woke up.

"I had fallen asleep, or become unconscious, spread across the table and still sitting in the chair. My watch was in front of me—and to my horror, it pointed to a quarter to three. I had been asleep for a full two hours. I got up in a hurry to make for the door, when I stumbled across my sergeant, who was lying stretched on the floor!"

"A moment, Mr. Pennefether," I said. "What metal is your watch?"

"Eh? Oh, gold—gold—a little plain watch I wear with my uniform——"

"May I see it, please?"

"It is still lying on the table beside you there—under that paper."

I found it and turned it over. I nodded to Lord Almeric.

"Tarnished," I said.

"Ah," said Lord Almeric. "Go on, Pennefether."

"Naturally, I was bewildered. I stooped over Withers and shook him. He woke up without effort, and presently was on his feet, stammering out excuses. . . ."

The rest of the young guardsman's story was as we expected. He had rushed out into the corridor, and had found all his men fast asleep, his sentries fallen at their posts with their rifles beside them. His next thought was for the vaults. The big steel doors had been cut open and the interior of the vaults were strewn with the wreckage of cases.

In the matter of the Bank of England, the inspector could bring up no new point. He had been wakened by one of his men, having fallen asleep without any premonitory symptoms, and on going his rounds he had found all his points asleep or on the verge of waking. He had joined Mr. Pennefether at the vault door. But he told us that three of the joint stock banks in Old Broad Street had been forced open and their strong-rooms cleared.

"Our friends hold to their thorough methods," said Lord Almeric to me. "There is a scope in their rascality that takes the breath away."

He turned to the young officer of the Guards.

"It is useless to beg you not to be concerned, Pennefether," he said gently. "That you must inevitably be. But I beg you—and you also, inspector—to be rid of the idea that you are in any way culpable. You could not have foreseen this event, nor could you have helped yourselves if you had. The blame, if any, attaches to me. I should have taken steps to protect the Bank from this outrage. Come—let me see the extent of the damage."

In the Bank premises, everything was scrupulously neat and tidy, until we came to the vault door, and that had a section cut through it. It was big enough for Lord Almeric to go through, and I followed him.

"They have not been greedy," said he. "They have taken only a million pounds sterling, Jimmy—and have left the remainder. Now, let us see how they have treated our securities."

He turned to a side-door, which also had been treated with the flame. Inside the room was a heap of mouldering papers, and from this there rose a pungent smell. The papers were securities, and they had been destroyed beyond recognition by having had acid poured over them!

"The wantonness of it!" cried Lord Almeric. "The sheer damned wanton uselessness of it! Ur-r-r! The theft of the gold I can understand—but this!—this means months of work—chaos—endless useless bother and vexation!"

"Does it represent much money, sir?" I ventured.

"Millions. I cannot say how much. It will be recoverable, the greater part of it, perhaps. But when I think of the complications—the damned meaniness and bother—ur-r-r!"

He recovered himself quickly.

"I beg your pardon, Jimmy. I'm making an exhibition of myself—but the thing is so unpardonably stupid. Come, we'll go to my room and think this out."

"Your pardon, Lord Almeric. There's something I'd like to do before the crowd gets about. Could you put me in charge of a police officer, while I go snooping round to find out if the thing links up with Wall Street?"

"Why, of course. Would you oblige me by taking Mr. Boon round, inspector, and seeing that he is not interfered with?"

"Very good, my lord."

Conjectures

I WENT off with the inspector and got outside the buildings. I hunted round the streets about the Bank in comparative quiet. The London police are nothing if not efficient, and they had drawn round the district a cordon that was impassable. Only a few civilians were about the streets.

I found four star-shapped splatters of powdered

glass on the Exchange side of the Bank, and two in a sort of courtyard within the buildings. They were perfect in shape, and showed me what the smears I had found round Wall Street would have been but for the crowds that had trampled them about. We went along Old Broad Street, and there I found traces of the powdered glass, three splashes, opposite the robbed banks. I thought it would be a waste of time to do anything further in the way of investigation. I had seen enough to convince me that it was the Wall Street and *Parnassic* gang, or another allied in method. My next move, I thought, would be to get an ocean track chart.

On my return to the Bank, I found Lord Almeric closeted with a military-looking man, alert and keen of manner.

"This is Mr. James Boon, Sir Thomas," said Lord Almeric. "General Sir Thomas Basildon, Jimmy, chief of the Criminal Investigation Department."

We shook hands.

"I have wanted to meet you, Mr. Boon," said the newcomer kindly. "I have known your work for several years—and admired it."

"That's very kind of you, sir. Are you the General Basildon who was connected with the British Air Force?"

"I am."

"Then you have something in your old line here, Sir Thomas," said I. "I'm willing to bet you already have your air police out in full force, scouring the air towards the Atlantic."

Sir Thomas nodded slowly and looked at me keenly.

"You're the man who first propounded the theory that the American raids were carried out by aircraft?" he asked.

"Can't claim that amount of credit, sir. It was just the obvious sort of idea that must have come to a lot of people together. I said an airship, because of certain difficulties of manœuvring, taking up the weight of the stolen stuff, the regular practice of stealing gasoline."

"Let me say at once that I agree with you, and that I have taken a very serious view of the matter as it might concern us here. I wanted our people to adopt the recent American plan of supplying gas-masks to all guards on banks, and to put up gas-proof glass observation cages at favorable points. That was your idea, too?" he broke off.

"No. The suggestion for that came from a friend of mine, Dan Lamont, sir."

"Ah, yes. Mr. Dan Lamont," said Sir Thomas. "Well, I wanted our people to adopt these measures, but they are slow to move—damnably slow! They were convinced that the raids were an American concern. The measures are being adopted, after prolonged discussion, but they come too late, as usual, to be of any service." He laughed grimly. "We shall probably have the masks and the cages ready by the time the raiders have been run to earth."

"If you think that, you will have your scouts out?"

"They have been in the air this last hour or so, Mr. Boon," replied said Thomas, with a smile. "I understand from Sir Almeric that you have been on the scene soon after each raid?"

"With the exception of the *Westbury*, yes."

"There are some points on which I should like the benefit of your experience, Mr. Boon——"

"Anything I can do, sir——"

He questioned me shrewdly, until I had covered the ground of the whole raids, down to the minutest detail. Then when he had satisfied himself that he had exhausted all my information, he got Lord Almeric to have an ocean track chart found for us, and we pored over it together.

It took the Transatlantic Company's airships a net sixty hours from New York to London, but a less heavily-built machine might do it in fifty-odd. Adding on the difference in time between the two cities brought the time occupied to about sixty, gross. That is to say: if an airship with a cruising speed of about one-thirty kilometres per hour had wanted to be over London just after midnight on Friday, she would have had to leave her base on the American continent not later than midday on the Wednesday. But the chances were that, to escape observation, the departure in actual case had been made in the dark of the early Wednesday morning.

Calculations

THE Louisville raid happened on Sunday night and Monday morning, and it was likely that the airship had made her base either in the dark of the Monday morning or on Monday night. Leaving Louisville about four after the raid, it would be six before she reached any likely base in the Alleghanies, and by that time the farm folks would be about on their morning chores. The vessel could hardly escape being seen in the light at six o'clock. This brought us back to the notion of a base at least twelve hours' flight from Louisville, and gave additional color to the theory of a base over the Canadian border, probably in some undeveloped district back of Ontario.

To berth an airship on the Monday evening, and to have her fitted out again for a raid across the Atlantic within thirty-odd hours, was something of a feat. There was the unloading of the Louisville haul, the refilling of the ballonets with gas, the retuning of the engines, and the general tightening up and overhauling necessary for such an important voyage. If the raiders were using only one dirigible, she was a wonder of efficiency.

It was quite within possibility that they had two machines for their operations, and the three of us discussing the situation in Lord Almeric's room were not inclined to dismiss the idea idly, when we considered the daring which could conceive and carry out raids on such a wide radius, and the magnitude of the organization behind the conception. Indeed, it seemed not too far-fetched an idea that the organization operated from bases in both the Old World and the New, and that in imagining one solitary lair in Ontario we were seriously underestimating the power of this mysterious force.

There seemed to be neither rhyme nor reason in the operations. Of several millions of pounds sterling in gold lying in the Bank of England, the raiders had abstracted merely one, so Lord Almeric told us, and all the trouble that had been involved in forcing the three joint stock banks had not yet been rewarded by the finding of any gold; but in each of these banks there had been the same insensate destruction by acid of thousands of pounds' worth of bearer securities. It looked like the work of madmen, impish destructiveness and senseless expenditure of energy. Why trouble to force four banks when there was sufficient loot in the most important?

"It might have been," I suggested, "that they broke

open the Broad Street Banks first, were disappointed of a haul from them, and destroyed the securities out of spleen then came onto the Bank of England only to find that there was more gold here than they could get away with."

"I'm afraid, Jimmy," said Lord Almeric, "that that explanation will not serve. It is a matter of almost daily news how much gold is deposited in the Bank here. It is also common knowledge that the joint-stock banks since the war have kept no reserve of gold, but have had a working arrangement with us."

"These are not criminals in the ordinary sense," said Sir Thomas. "The distribution of the radium points to that, the care that has been exercised to preserve life in the raids. There is some idea, as you have said, Mr. Boon, underlying it all, and the future will probably show what the idea is. We may regard this raid as a demonstration of power, an attempt to bring chaos into the business world, to upset values—some cranky method of advertising an idea presently to be revealed. If I may be allowed to express what is merely an intuition on my part, I do not believe that these raiders value even the gold they have taken. They have marvelous power—marvelous! But the vulnerable point in any scheme of attack is its weakest link. That is in the air in this case. I cannot believe that the scheme of the raiders can be carried out with a dirigible. We have proved the vulnerability of the airship time and again, and it is on this point that we will get them. I shall not concern myself solely with looking for these criminals or cranks on solid earth. I will keep after them in the air, and, by God—get them, too!—if they are on my side of the globe!"

And Fears

"BULLY for you, General!" I couldn't help yelling, he spoke with such force. "I beg your pardon."

"Not at all," said he. "The best thing you can do is to get back to America at your quickest speed, and pitch into the authorities there. If the raiders are operating from Canada, until measures are taken to stop them the whole of your wealthy cities round the Great Lakes are at their mercy—Chicago, Buffalo, Detroit—and the coastal cities, also—Boston, Philadelphia, Washington. Make them see what you and I see, that if this menace is to be scotched, they will need aeroplanes, fighting aeroplanes that can climb to five thousand metres and more. Make them understand that this is not any parochial question, or national, but that it is for the world to face and beat. For me, I shall strongly represent to our government that the Canadian authorities be asked to go over their territory with the minutest search they can. And I will put the French police on their guard—and the Germans—the Germans——"

He broke off and eyed Lord Almeric queerly.

"No, my dear Basildon," said Lord Almeric. "I can believe much of them, but that they would leave so many millions of the gold they so badly want behind them—no."

"A blind?"

"Not they. They are incapable of the sacrifice."

"Humph! Perhaps you're right—perhaps you're right. Though, by George! they've got the ships—and you never know but what they have the gas! I'm certain that they have never stopped their research."

"Think again, Basildon—think again. Would the matter of a few Americans or Englishmen asphyxiated deter brother German from using poison gas if he had conceived the idea of these raids?"

"They want something better than their Zeppelins to get across the Atlantic with, Sir Thomas," said I, "and besides, how about housing them once they were in America?"

"Well, I relinquish the idea," Sir Thomas said. "I shall put the French—and the Germans—on the *qui vive*. If London this week, why not Paris or Berlin the next?"

"Why not?" Lord Almeric agreed.

"Br-r-r! And this damned government to move into action! Pah! Think of it, Pluscarden! The solemn idiots sitting all night through to this very morning debating a reduction of the Air Estimates—while this is happening, practically at the other end of the street! I wish to Heaven the raiders had given *them* a whiff of the gas—the prosy, pusillanimous, pompous, pin-headed——"

It is hard to say how far Sir Thomas would have got with his alliteration, if the telephone bell had not rung just then. Smiling at his friend, in spite of the gravity of the situation, Lord Almeric picked up the receiver.

"Yes," he said into the microphone, "Sir Thomas is here. Scotland Yard for you Basildon."

"Ah, good!" said Sir Thomas. "We may have some news!"

Basildon Gets His Wish

SIR THOMAS BASILDON took the receiver from Lord Almeric, and sat on the desk to talk into the instrument.

"Yes, Ferguson—Basildon speaking," he said. "Eh? Ah! Yes, well, I half expected that. Army and Navy Stores? Aha—that, too. Eh? Just a minute, Ferguson." He turned to us.

"The thing's complete. A petrol station at Purfleet—the Anglo-American Oil Company—reports a deficiency of six thousand litres of petrol, and the whole establishment put to sleep. The Army and Navy Stores in Victoria Street have been forced open, and a large quantity of foodstuffs taken away, money being left. Now, Ferguson——"

He turned to the mouthpiece again, and almost immediately an incredulous look passed over his face.

"No!" he shouted. "Don't pull your chief's leg, Ferguson—it isn't done! Tell me again. With their faces blackened? Well, I'm damned!"

He burst into a roar of laughter, shaking, shaking, until Lord Almeric and I sprang up in alarm. Soldiers have given way to hysterics in the midst of a great nervous strain before, and I thought the general had an attack. I don't know what Lord Almeric thought, but he evidently considered the laughter a little ill-timed.

"No, no! I'm all right, really—I'm not unstrung!" gasped Sir Thomas. "The raiders *did* gas the Commons this morning—and every man jack on the Treasury Bench woke up with his face blackened! Blackened, by George!—with burnt cork!"

"What?" cried Lord Almeric. "You aren't serious, Basildon!"

"Serious as cholera," said Sir Thomas. "Ferguson has just told me—and he's too solemn to joke on any subject."

There was no help for it. Lord Almeric tried hard to keep his face straight, but he couldn't—and presently he and the general were lying back helpless in chairs,

laughing till tears streamed down their faces. I thought it funny enough, but their laughter got me more than the joke.

"Confound it, Basildon," said Lord Almeric, mopping his eyes. "The thing's farcical. It couldn't have been the raiders—surely not!"

"Must have been, Pluscarden. Boxes of radium were left beside the mace, addressed to some of our research institutions. The thing's conclusive!"

"It might have been one of the Opposition who woke up first and snatched the opportunity to make the front bench look ridiculous. It is enough to wreck the Government."

"Might have been that," Sir Thomas chuckled, "and I hope it does wreck the Government. We may get the Die-Hards back again, thank God."

"Let us hope so, Basildon. Well, there is little use in remaining here. We can do nothing until the clerks turn up, when we can go through the books. Heavens, what a mess!" said Lord Almeric. "I think a ride home and a bath, then early breakfast, is the idea. Let us go, Jimmy."

"Just let Mr. Boon show me those splashes of powdered glass, Pluscarden," Sir Thomas said, "and I'm with you. Could you drop me at Scotland Yard, if I send my car on? I want to talk to you on the way."

"Surely," said his lordship. "I'll pick you up outside."

There was no great crowd in the streets yet, for it was barely six o'clock, but Sir Thomas no sooner appeared than he was surrounded by newspaper men, who wanted a statement.

"I can't give you any statement yet," Sir Thomas protested. "Yes—yes, you can say I believe it to be the work of the *Parnassic* gang. That must be obvious. I shall issue a general statement when I get back to Scotland Yard. I must treat you all alike."

They fell away from him, but watched him from a distance, and when we had finished looking at the smears of glass and had gone on, I saw them gather round the spot and examine the powder closely.

"Glass bombs, I agree—probably containing the gas in liquid form," said Sir Thomas. "I wonder what it is?"

The newspaper men were still hanging round the smears when the three of us drove away in Lord Almeric's automobile.

"I must have those policemen sent away," said Sir Thomas, when we had passed through the cordon which was holding a small crowd back from the area which had been gassed. "It is nothing but a waste of time."

He and Lord Almeric talked earnestly enough as we made our way to the West End, but though they did not exclude me from the conversation, it was of stuff that was Greek to me, and I was more interested in the wakening streets. I should like to have seen how Fleet Street was taking the event, but we went down a street which brought us out on the Embankment by Blackfriar's Bridge, passing the building that during the war was known as Adastral House, where I had tried to get into the British Flying Corps by swearing I was a British citizen. They wouldn't have me because of my age. I was only a kid then. The building now seemed to be the offices of some commercial firm. I remembered my chagrin at being turned down by the British authorities, though they were extraordinarily kind to me, and looking back at that time, I got a-tingle all over to think that I was taking a lively part in an affair pretty night as exciting as the war I had wanted so much to get into.

It made me smile to think of the intense awe I should have had for the general in those days, or even for Lord Almeric, kind as he was. A mighty queer set of happenings, thought I, that brought me to be sitting in a limousine with the chief of the British C. I. D. and the deputy governor of the Bank of England!

We dropped Sir Thomas Basildon at New Scotland Yard, passing through the courtyard into Whitehall.

"You must permit me to worry you a trifle more, Mr. Boon," said Sir Thomas, as he stepped from the automobile. "I want you to recount your experiences to some of my men. May I ring you up at Lord Almeric's?—or, no—let us fix the time at twelve-thirty to-day. And perhaps I may be able to snatch a minute or two to see your new plane—what d'ye call it?—the *Merlin*?—if I may be allowed."

"Delighted, sir," said I. "Twelve-thirty, then. Here?"

"Here," he replied. "Ask for me at this door. They'll bring you straight up."

As we turned into Whitehall, I caught a glimpse of crowds in Parliament Square.

"Surely the Senate—the Parliament isn't still sitting?" I asked Lord Almeric.

"No," he smiled. "I expect they've gone home by now. But you know what crowds are. They will hang around Parliament Square for hours in the vain hope that they will see somebody who has had his face blackened, and they will give a circumstantial account of how nearly they accomplished it, years after."

One-third the Sun's Speed

WE reached Lord Almeric's house in Knightsbridge about half-past six. Milliken was nowhere to be seen. I looked about for a servant, and found the one who had opened the door, yawning on the landing.

"Do you know where Mr. Milliken has gone?" I asked.

"No, sir. He must have slipped out early, before the 'ouse was properly astir, sir—if he has gone," said the man with an air of suspicion.

"Very well," said I.

I guessed that my mechanic had gone down to begin work on the *Merlin*, so I had a bath, and presently joined Lord Almeric at breakfast.

"What plans have you for to-day, Jimmy?" asked his lordship.

"First, I shall cable my father, and get him to begin the campaigns against the raiders so that a cordon of scouts can be drawn round the coast to-night. Then I will have to attend to the *Merlin*. I propose starting for America at ten to-morrow, so as to arrive before dark."

"Bless me! How on earth can you do that?"

"I leave at ten from here, and taken thirteen hours to make Long Island, nominally eleven o'clock at night—but as a matter of fact it will be six o'clock, American time, when I arrive. I get back the five hours we lost coming here."

"I had forgotten that," said Lord Almeric with a smile. "One of these days you young men will be beating time itself."

"Ah," said I. "We've got to fly at about thirteen hundred kilometres per hour to beat time across the Atlantic from east to west."

"Good God!" he cried. "You don't mean to say

you've reckoned it out?"

"Why not?" I grinned at him. "When I started flying, ninety miles an hour was thought good going—that's a hundred and forty-four kilometres. My *Merlin* does three and a half times that speed, five hundred odd—which is more than a third of sun speed."

"Jimmy," said his lordship, "I give you up. You are too much for me. Tell Sir Thomas Basildon that when you see him to-day, will you?"

"All right, sir."

He made for the door, where he turned.

"Good morning, Jimmy," said he. Then, "Do you think it will ever be done?"

"Why not? Shells do it. We might find a new principle of flight."

He went out, shaking his head.

I finished breakfast and went down to Battersea, where I found Milliken with half a dozen mechanics busy over the *Merlin*.

"Hullo, Milliken!" I said. "Where did you get to this morning?"

"Here," said he. "Knew that the sooner I got on the job, the better, seeing that we'll be going back to-morrow. She's in fine trim, though—and as sound as a bell."

"Good. Did you have any breakfast?"

"There's a quick-breakfast counter and hot-dog cabin in the street on the other side of the bridge," said Milliken, "but they don't sell any fruit."

"'E means a cawrfee stall, sir," one of the mechanics explained.

"I get that."

"We're goin' to take 'im round the corner presently w'en we knocks off, to a chop-'ouse. 'E'll get a real breakfis' there. But 'e won't get no dog or fruit—'cept the sossidges might be dog—and a banana."

When the mechanics had gone, taking Milliken with them to the "chop-'ouse," I got off my coat and jacket and went over the bus. As Milliken had said, she was as sound as a bell. I worked with the men until midday, when I walked to Scotland Yard.

I told all I knew to half a dozen detectives, and stood the fire of questions they shot at me, until at last they all got up and trooped out, solemnly shaking hands with me, each one of them. Then Sir Thomas came along and inspected the *Merlin*. He expressed a high opinion of it and offered to use his influence if I wanted to dispose of it to the British Air Board. I told him that would depend on what the American authorities thought of it, and if they'd approve of Britain having it, my own country naturally coming first with me. He patted me on the shoulder at that, and said I was quite right. Then we had lunch together at his club, and after that I collected Milliken and pulled him around the town.

Crowds were collected here and there about the streets, and you'd come on small knots of people, laughing like mad over the papers. It did seem as if nobody cared a red cent about the raid on the banks, but that everybody thought a great deal of the joke played on the British ministers. I knew that many a minister and public servant had been sent into retirement through ridicule in France, and that the trait was peculiar to the French, but if the Cabinet of the British government could stand the guffaws that went up that afternoon, they were gummed to their seats with Hercules cement. I collected a few of the journals for future reference, and took Milliken to a picture theatre.

It was late again when we got back to Lord Almeric's, and we found his lordship waiting for us, with the whiskey decanter all ready. When at last we did go up to bed, he came into our rooms and pushed a tissue-wrapped package into my hand, and another into Milliken's. Then he went away before either of us could say anything.

I must say that Lord Almeric had speed in doing kindnesses. Milliken's package contained a tobacco box of silver, inside the lid of which was engraved:

To W. M.
In remembrance of an enjoyable Atlantic flight with
"As proper a man as ever trod neat's leather,"
from A. P.

Mine was a gold cigarette-case, and in it was inscribed:

To J. V. B.
In remembrance of an Atlantic flight at
One-third of the sun's speed,
from A. P.

CHAPTER IX
Berlin and Paris

ON the Sunday morning, Milliken went off early to the *Merlin*, taking his own luggage and mine. Lord Almeric and myself were having breakfast together, and had barely started when a servant came in with word that Sir Thomas Basildon wished to speak to his lordship on the phone. Lord Almeric came back with ever so slight a ruffle of excitement on his habitual calm.

"Basildon was right," he said. "He has just told me that the raiders visited both Berlin and Paris this morning."

"In one night!" I exclaimed. "Then it looks as if they have more than one airship in Europe, Lord Almeric. From Berlin to Paris is well over seven hundred kilometres, and the voyage would take the average airship more than four hours. Did he say at what time the raids took place?"

"No. He is on his way here now to say good-bye to you, Jimmy, and he will have breakfast with us. We shall have full details then." He turned to the butler. "Sir Thomas Basildon will have breakfast, Bunter."

"Very good, my lord"

"We are beginning to find the amazing measure of our mysterious enemy," Lord Almeric went on. "It must be a huge organization. Think of the quantities of ore which must have been reduced to result in all that radium—and the expense of the operation! Why, the amount left in New York, Louisville, and London here, represents as much money as has been taken in the various raids. That alone is a staggering fact. The preparations for these raids must have occupied a number of years."

"I'm with you there, Lord Almeric," said I, "and the secret has been astonishingly well kept. It beats me to know how the airships could have been built and their docking sheds erected without the connivance, or at least the hoodwinking, of the government in whichever country the bases of the raiders are situated. I said bases—because the thing gets bigger every bit of news. How can we be certain that there aren't a number of bases both in Europe and in America? I'm beginning to get fogged, Lord Almeric. When the thing first started, I thought we were up against an ordinary gang of crooks using new methods, and that one en-

counter with them in the *Merlin*, once she was carrying her armament, would settle the business. I'm not so sure now. I don't know where I'm going to begin."

"The problem is not at all a simple one," Lord Almeric agreed. "But you are taking the only way in which you personally can deal with the situation, Jimmy. If you can persuade your government to be fully prepared for further raids, you will do a great service. And you never know but that you will have the luck to encounter one or other of the airships in your seaplane. It will be an interesting fight if it ever occurs."

"There's the devil of it," I said. "My bus would have a better chance of whacking them than any other in existence—I may sound a bit chesty when I say that, but you know how good she is——"

"I think I do," he smiled, "and I don't think you the least 'chesty.'"

"Well, then. I sell my design to the government, and so give a number of good fellows a chance to pull off the fight I want to have myself. I'd like to be selfish and hog the whole thing for James V. Boon."

"Nonsense, Jimmy," said his lordship with a twinkle. "You'll play the game and give your side full benefit of your knowledge. You realize as well as anyone that only good team-work will scotch this menace."

"No. Hogging won't do," I agreed. "I'll have to put the *Merlin* into the pool."

In an incredibly short time we were joined by the chief of the C. I. D., who must have done violence to all the speed laws of the city.

"What do you think of it, Pluscarden?" he demanded. "Didn't I say Paris and Berlin, eh?"

"Yes, you were right, Basildon"

"An astonishing thing about it to me is both cities being attacked on the same morning," said Sir Thomas, already busy at the breakfast-table. "The raid on Berlin seems to have started at half-past twelve this morning. The district round the Reichsbank was subjected to gas at that time, while the Berliners were still on their pleasures. It was seen that something queer was happening. Folk venturing over a certain fairly definite line simply fell staggering to the ground, while others outside the line could watch it happen. The police tried to get into the district, but met with the same fate.

"It did not dawn on anyone," he went on, "anyone in authority, for some time, that the city was going through a similar experience as that of New York and London—even though I had warned the police yesterday morning—but at last gas-masks were sent for. They were no good against the anæsthetic. The police wearing them fell just the same. Would you oblige me with the mustard, Mr. Boon?"

"Did they try to get above the district in the air?" I asked, passing him the pot.

A Realization of War

"THANKS," he said. "I'm coming to that. While they were still fiddling about with the masks and making bull-foolish rushes into the gassed area, nobody had thought of calling out the air scouts. They found the air clear on the tops of the buildings, and tried to approach that way, but of course came to openings that were impassable. It was over an hour before the first air scout came wheeling over the district—the damned fools—and by that time there was nothing to be seen above or below. About two o'clock it was possible to get into the area, though here and there the police were overcome by the gas even then. Pockets, I suppose, where the fumes—or whatever it is—had not dispersed. Only the Reichsbank had been forced. There was no gold to take, but not only had securities been destroyed, but the bulk of the ledgers had been absolutely obliterated by the use of acid. This is amazingly good ham, Pluscarden—your own breeding?"

"Good God!" said Lord Almeric. "Yes—the ham is from the farm."

"I've seldom tasted better," said Sir Thomas calmly. "Yes," he went on. "A pretty rotten trick! The usual boxes of radium had been left, this time in the bank itself. By one-thirty every available aeroplane was in the air, but though they may still be searching, up to now there has been neither sight nor sound of the raiders reported. That's Berlin. Now, here's a fact that will make you pause and consider, Mr. Boon. Within three hours, Paris was visited."

"One moment, Sir Thomas," I interrupted. "Three hours' actual flight—or clock time?"

"I mean three hours' actual flight," he replied. "I'm remembering the hour difference between Berlin and Paris clocks. Shortly after three, Paris time, the raiders had descended on that city. Here some considerable time passed before it was discovered that anything uncommon was in progress. The raid was concentrated on the Banque de France, and, if you remember your Paris, there's not much doing just there, even though the Avenue de l'Opéra close by may be swarming with night-birds. As soon as the alarm was given—pretty much from the same circumstances as had become apparent in Berlin—soldiers and gendarmerie were pushed along to surround the Banque, but they could not venture closer than the north side of the Place des Victoires on the north and on a line from the Palais Royal on the south. The police brought gas-masks, with the same result as in Berlin. They even brought up a wagonful of oxygen tubes, which they drove slowly up Rue des Bons Enfants, releasing the gas as they went. But the driver of the camion was overcome and switched off his engines before they were half-way up the street, and the crew was so affected that nothing could be seen of what was happening round the Banque. Meantime, there had been no delay in bringing up the air police, except for the time that had elapsed before the alarm was given. The airship was seen——"

"Ah!" cried Lord Almeric, and I felt a thrill run up my spine.

"It was seen," said Sir Thomas again. "It was snuggled down on top of Rue Bailiff, hugging close to the buildings. The unfortunate thing is that both the scouts who saw it developed engine trouble and had to come down. One almost crashed in the Palais Royal Gardens—he hit a plane tree—but the other made a good landing in the Place du Carrousel. By the time the others came up, the airship was gone, and although the French and we have been scouring the air—searchlights and everything—not a single trace of the airship has been discovered."

"What an unlucky thing that the engines of both machines conked," I said.

"If both pilots hadn't been men of proved daring and pluck," said Sir Thomas, "the inclination would be to say they funked, for when the engines were examined, not a thing wrong could be found. It's a mysterious affair. I can't make it out."

"Could the airship have done anything to them?" I asked.

"I don't see how she could," he replied. "They were flying high enough to clear the buildings in landing—and surely out of range of anything the raiders could do. What makes me mad is the selfishness, the pig-headedness of the German police. My people didn't get the news from Berlin until after the Paris call, and apparently the French only heard from Berlin while the raid on Paris was actually happening. If the Germans had been anything alive, and had sent warning to the French in time, the chances are that the airship would have been intercepted on approaching Paris. There's a rotten thing, if you like! The whole chance of getting at the raiders gone—and all because the Germans were too busy getting excited over their own affairs to think of anybody else!"

"You realize, of course, Sir Thomas," I said, "that if the same airship raided both Paris and Berlin, it must be up to doing close on three hundred kilometres an hour?"

"I hadn't lost sight of that, Mr. Boon," he replied, "and I don't know what to think. If it wasn't the same airship, we're left to the conclusion that there are at least two in Europe, which leads to the possibility that there may be one or two in America—and these raids are given the significance of a real war. What's the greatest airship speed made hitherto—can you remember?"

"Propert with his *America* did nearly two-twenty kilometres in an hour's spurt off Sandy Hook in 1926," I reminded him, "but a puff of wind buckled his machine. It was too light in construction."

Good-bye

"I REMEMBER. Phew! Three hundred is amazing speed for a dirigible—but—the brain that can discover a gas capable of putting cities to sleep—will you deny it the ability to invent a machine to do a mere three hundred kilometres the hour?"

"Not me," said I. "It seems to me we're up against one of the cleverest minds of the century. Where did they—the raiders—get all that radium, for example? Lord Almeric was asking the question just before you arrived."

"Blessed if I know," said Sir Thomas, very much the bewildered soldier for a moment. "That radium would be enough to float a company in the City with millions of capital—eh, Pluscarden?"

"Yes, I should think so," said Lord Almeric. "But, Basildon—you haven't mentioned the damage that was done to the Banque de France——"

"Bless me," said Sir Thomas, helping himself to marmalade. "Didn't I tell you what happened there? They left radium as usual—and also gold ingots valued at twenty-five millions of francs——"

"What!" Lord Almeric jumped to his feet.

"They left gold valued at twenty-five million francs," Sir Thomas repeated quietly.

"What madness is this?" cried his lordship. "It is fantastic! Incredible!"

"I'm giving you the information that was passed to me, Pluscarden," Sir Thomas said distinctly.

"My dear fellow—I did not refer to you, but to this action of the raiders," Lord Almeric explained. "Tell me, did you learn if these ingots were stamped with any government mark?"

"I asked particularly about that. They bore no marks by which they could be identified."

"It is astonishing. I can find no real motive for any of the raids—but this—this—what do you make of it, Basildon?"

"I can make nothing of it—especially as the ledgers of the Banque de France suffered the same treatment as those of the Reichsbank—utterly obliterated."

"The thing seems to me so wanton—so useless," said Lord Almeric. "The trouble that must ensue—no record of transactions—how can all the complications that must result be sorted out? It is monstrous!"

"It's pretty damnable," Sir Thomas agreed, rising as he spoke. "If the idea of the raiders is to bring business to a standstill, they are going the right way about it. Well, we must do our best to run them to earth. Sitting still won't do any good. You'll do your best when you get back to America, Mr. Boon, to make those in authority realize the position? Your father will help you there."

"I shall cable Mr. Boon myself," said Lord Almeric, "and Jimmy here will supplement my efforts."

"That being so," said I, "the best thing I can do is to get back to America as quickly as I can. I can do nothing further on this side, Sir Thomas?"

"You have done us great service in bringing Lord Almeric back so speedily, and in telling us about the American raids," said he. "Your work is on the other side of the Atlantic. But I shall keep you posted. If any new development occurs of which the news might help you in your investigations, I shall inform you as quickly as I shall the police over there—depend on that. Now, I'll say good-bye—and wish you every possible good luck. I hope we shall meet again, Mr. Boon."

"I hope so, sir," I said. "Good-bye, and good luck to you, sir."

"Thanks. Good-bye. I shall see you later, Pluscarden?"

"Yes. I intend to see Jimmy off—then I shall be fully available, Basildon."

"Good."

Sir Thomas marched off, and presently Lord Almeric and I were driving down to Battersea and the *Merlin*.

We wasted no time in getting away. Lord Almeric bade Milliken and me hearty farewells, and to a cheer for my mechanic from his English *confrères*—with whom he had apparently established himself a favorite—we took off just before ten o'clock, due west and headed for our own country. With our luck holding, we reckoned to be at Gardiner Bay by half-past five, American time.

The Return

WE were flying high by the time we got above the Bristol Channel, and every now and then we would pass a plane, one of Sir Thomas Basildon's scouts. He must have sent out word of our departure, for we were not challenged. When we passed near enough, we invariably got a signal wishing us good luck, and once or twice a voice came over the radio phone, which was in open circuit, with a, "Cheerio, *Merlin*—keep your eyes skinned going over!"

Once above the open sea, I gave the pilot seat to Milliken, and turned to read the English journals I had brought with me. They were full, of course, of the raid on the Bank of England, and for the most part, the story was told without much flourish or waste of words. In the leading columns of some, the fact was glossed over that the government had been caught napping with a policy of reducing the air service, and space was taken up with useless condemnation of the "criminals" behind the raid. Those particular journals, it was easy to see, were government organs.

The papers of the opposite party vigorously rubbed in all the damaging facts, and were brightly humorous over the blackened faces of the Cabinet. One journal spoke ponderously of the affair in the House of Commons as if it had been a sort of negro-minstrel show:

THE WESTMINSTER TROUPE OF MINSTRELS

There has long been a suspicion of a familiar flavor about the nightly entertainment at St. Stephen's Hall. Time and again some chord of memory has been struck, and we have endeavored in vain to trace where we had heard that note before, but the bright idea conceived by the leading comedian at our famous house of amusement—nothing more subtle than the use of a little burnt cork—revealed in a flash whence came the old familiar flavor. The Negro Minstrels, of course!

"Brudder Bones, cane yu tail me the simularrity between an orphan boy, the Prince of Wales, a bald-headed man, and a monkey's mother?"

"No, Brudder Jawsun, ah cane not tail you the simularrity between—etc., etc."

The surprise sprung upon us was an elaborate one. It was known that great efforts were being made on the part of the management to provide a full-dress, bumper entertainment. None of the leading lights of the Front Bench were to be missing; from corner-man to corner-man, and from the front row to the back bench of the chorus, the full complement of the company was to be turned out for this occasion only. We were to witness the screaming absurdity entitled, "Too Much in the Air."

It must be confessed that the entertainment dragged a little at the start, due to the inclusion of too many stump speeches in the programme.

The speakers, moreover, all were too conscientiously impersonating the old-time Members of Parliament, and it is a well-established axiom in the art of entertaining that close imitation of familiar types need not necessarily be funny. The broad touch of burlesque was needed. It is painful to report, so tedious did the show become, that not only the audience fell asleep, but the entertainers themselves were lulled into peaceful slumber! Even the bright particular stars of the Front Bench were affected, and fell victims to their own soporific platitudes, sleeping, by the clock, a round couple of hours.

Whether it was that the leading lights of the troupe slowly awoke to a realization of the failure of the show, and took swift measures to rescue the situation, or that the boring of the audience was calculated to heighten the intended surprise, is a matter on which we are not prepared to express an opinion. It is sufficient to say that when the other occupants of the hall woke up and found the stars of the Front Bench all confessing the real significance of their earlier efforts by having had their faces burnt-corked, a shout of laughter went up which bade fair to wreck the house. The pity is that the management did not introduce the surprise earlier in the evening, instead of taking such elaborate measures to secure one big laugh. It would have given point to the coincident occurrence which was taking place in the city. . . .

With a modesty not habitual in popular entertainers, however, the leaders of the troupe have emphatically disclaimed all knowledge of how the delightful surprise was worked, and even have tried to attribute the happy inspiration of the burnt-cork to the visitors to the Bank of England. In their haste to be so wonderfully modest, they have almost an air of wishing to convey the impression that their efforts in the earlier part of the evening composed a serious attempt to reduce the air services of the country. That the St. Stephen's troupe has some sort of right to discuss such an important matter cannot be denied. But if the troupe really was trying to discuss this serious national question, and really was determined that the air service of the country should be reduced, in the face of the outrage on the Bank of England—which might readily have been prevented by an adequate air patrol—their participation in the affair passes beyond a joke. It is no joke for the country to be deprived of a million pounds sterling, while black-faced minstrels occupy seats that once were filled by statesmen, and handle matters affecting the country's weal with the absurd inconsequence peculiar to their kind. . . .

There has been a growing feeling throughout the country that St. Stephen's is hardly the place for antiquated forms of amusement, and that the old hall should be brought back to its onetime dignity as a chamber for the serious and considered government of the nation. Sharing this feeling, we venture the hope that the last effort on the part of the Minstrel Troupe may prove laughable enough to laugh them from their benches. Should this consummation be reached, we for one will be apt to reconsider our opinion, and regard the joke—*our* joke it then will be—as the only one we have ever encountered that really is worth a million British sovereigns.

The other Opposition journals did not see the affair quite that way, but they all made the most of it in their own manner. It seemed to me more than likely that the English Cabinet would be laughed out of office.

By the time I had got through all the Sunday papers, and found that none of them had anything to add to the details Sir Thomas Basildon had given about the Paris and Berlin raids, I was due to relieve Milliken. It was close on one o'clock, London time, and perfect flying weather. There was hardly a cloud in the sky, and below us the sea was like a bowl, deep blue in the centre, and shading off to a delicate green at the sharp edge of the horizon.

We had left the police machines far behind us, but we were passing over a British warship, merely a grey dot with a widening streak of white behind it. Further ahead on the sea, a series of sinister black shapes was spread out on a wide line, their wakes so definite, and the black smears of smoke athwart them so copious, that we knew them for destroyers traveling at full speed. Later, when from a grey shape below us, a white fleck parted, flickering in the sun, only experience told us that the ship was a plane-carrier, and the flickering speck one of her machines taking off. But though we must have been in sight on such a clear day, we passed unchallenged. In a few minutes these ships of war lay far behind us over the edge of the sea, and only now and then would we see the squat shape of a freighter, the more graceful lines of the passenger ship—plowing along in the slow, placid pursuit of their lawful occasions.

Noon overtook us after about four hours' flying, about two o'clock by the Greenwich time on the control-board, and after that the sun increased his lead south of us, until his angle narrowed almost to dead ahead. We kept a strict watch for the airship until after six by our clock, and giving her the amazing dirigible speed of three hundred kilometres an hour, by that time we should have overtaken her, supposing she had left Paris shortly after four in the morning. But the sky remained clear of aircraft until the time when we came upon American machines, with warships in convoy, throwing a cordon round the Atlantic seaboard.

By then we had made landfall with Cape Race, and little more than two hours later we were hovering down into Gardiner Bay, Long Island. I had had a radio put through to my father telling when we might be expected; and he was there on the jetty to shake Milliken and myself by the hand when we landed. The clock in the hall at Hazeldene was striking six when I sat down for a rest and yarn with the old man.

A New Recruit

MY father listened with his usual quiet to all I had to tell, only putting in an occasional question or two and when I had finished he nodded satisfaction.

"Sir Thomas Basildon is right," said he. "We've got a long way to go before we reach the end of this business. Well, and what do you propose to do, yourself? Is there any way I can help?"

"Yes, dad," I said, "there is. I want to get a sort of roving commission with the air police. I want to be my own master, go my own way, and work along my own lines with Danny Lamont to help me. A sort

of general permit to scout about in the *Merlin*—armed to take action if I meet the raiders—that's what I'm after. Can you fix it for me?"

"I'll try. The authorities are not likely to favor any privateering, but—you're going to dispose of the *Merlin* design to the government?"

"Yes," I returned. "And that's another thing I want you to help me in. The Air Board knows me well enough—but I want speed. I don't want to be hung up in Washington for weeks, until the *Merlin* is tested."

"The *Merlin* should do the trick herself—but you'd better get straight to the President," said my father. "I can fix it for you to see him. Your reputation will stand you in good stead there, since you're not likely to be putting up any fool ideas. When can you be in Washington?"

"Tuesday morning. I'll fix up the armament belonging to the old *Merlin* on one of the new machines, and be fully prepared to show her on Tuesday. Milliken can fly the old *Merlin* at the same time, and take a mechanic or two with him. I don't want to part with the only armament I have. I might have to wait weeks for another equipment. So when the tests are over, I'll remount the guns on the old *Merlin* down there."

"I see. Then I'll write a letter personally to the President right away so that he'll have it by first mail to-morrow."

He went off to carry out this idea, while I made for the bathroom and a change of clothing.

"I have mailed the letter," said my father, when we sat down to dinner. "And if Ben Whitcomb won't do me the favor I ask him, I'll be a mightily surprised man."

"You know the President very well, then, dad?"

"We were together as struggling young men at one time, Jimmy," he replied—then with a reminiscent smile: "Golly! What a lot of fun we got out of that mighty thin time!"

I got to bed early and slept until five o'clock, when I went down to the workshops to get a start made with mounting the armament on the new *Merlin*. Milliken was on the spot when I arrived, and under his direction, the first shift was getting the guns out. Dan Lamont turned up in the middle of the day, and as the work was well ahead I had time to give him all the news from the other side of the Atlantic, and to tell him what my plans were.

"If you get these letters-of-marque, Jimmy," he said, "you'll have to sign me on as one of the crew——"

"But what about your laboratory work, Dan?" I'll be away from New York for days on end, maybe months."

"I have to admit that this job has me beaten, Jimmy," said he. "And I don't like it. I can't get at the tarnishing of the gold, and I can't discover a gas that will do all the supposed gas of the raiders can. It seems to me that they have discovered processes miles ahead of present-day ideas, and I want to know why and how. I want to be on the spot next time anything happens, and since you're going to look for trouble, it seems to me my likeliest chance is with you. My laboratory work can wait. This thing has got me going. I particularly want to know where, in the world, there's enough ore to produce all that radium. You'll let me in on this, Jimmy? If I don't know anything about flying, I can easily learn to use a gun, at least—and—and—I'm pretty handy with a skillet."

"All right, Dan. It's a bet. Consider yourself entered on the ship's books."

He took hold of my hand and wrung it as if I had presented him with a medal.

"You're a regular good fellow, Jimmy," he said. "And, say, Jimmy—if there's any shortage in the—in the ship's chests—don't forget I've got sacks, will you?"

"I won't forget, Dan."

Nothing would content him then but that I should write him out a list of the things he would need in his kit, and when that was done he made for New York as quickly as he could to buy the stuff.

The new *Merlin* was all ready late in the afternoon, and Milliken and I went up in her to try her for speed and for the synchronizing of the forward gun, which was an arrangement of our own. She answered perfectly. We had a new speedometer fixed which was numbered up to six hundred kilometres, and in one short burst the hand touched five-thirty. In that fact alone there was enough to make the government experts go crazy over her. Compared with the fastest known machine, she was a streak of lightning.

I will own that when I stepped ashore after the tests, I was almost drunk with excitement, and Milliken was little better. I was all impatience to hear the result of my father's letter to the President, and I got through to the old man on the phone.

"I was on the point of ringing you up, son," he said, "but you've saved me the trouble. The President has this minute left off speaking to me. He says he'll be ready to see you at eleven o'clock to-morrow. And I promised him you'd be on the doorstep of the White House right on time."

"Fine, dad."

"I won't tell you what he says to your proposition, but he was mighty flattering to your old dad. You'll learn from him to-morrow. Say, son—how did the new *Merlin* behave?"

"I won't tell you, dad—but it was mighty flattering to your young son. You'll learn from him at dinner."

I heard him chuckle, but it was characteristic of him to put up the receiver at once.

A Presidential Conference

AT half-past nine next morning, the original *Merlin* took off with Milliken and two mechanics, and a minute or two later the new machine with myself and another couple of men streaked after them, headed for Washington. We took it easy, and landed in the seaplane basin of the Potomac just before half-past ten. Right at eleven I was standing on the doorstep of the White House, never so nervous in my life. I had stepped in and was giving my card to a servant, when a white-haired little sturdy man came walking swiftly down the passage to shake me warmly by the hand. It was the President.

"You must be young James Boon," said he, and opened his watch. "Right on time. Glad to see you. Come along to my workroom and tell me all about this wonderful machine of yours, and what's this free-lance policeman notion you have."

He led me into a little room, furnished half as an office and half as a library.

"Bless me!" said he. "And so you're Jimmy Boon's son. Are you as good a man as your father?"

"Not by miles, sir," said I.

"Ah! You might fall that short of him and yet be a good man," said the President. "Come, now. Just tell me as quickly as you can all you know about these

raids. They are a matter of grave concern to me. Sit down—and shoot!"

Luckily, I had all the facts arranged in my head, ready for such a request, and I was able to give him a pretty concise summary of all that lay within my knowledge. While I was telling him, I had the opportunity of taking in something of his personality. I judged him to be hot-tempered, generous, and yet obstinate. A difficult man to drive.

"H'm!" said Mr. Whitcomb, when I had finished. "You seem to have kept track of all the evidence there is, and to have been untiring.

"I am glad to have from you the opinion of Sir Thomas Basildon and of Lord Almeric. It is better than any cabled account. This is a very serious business, and the effects are already disastrous——"

He rose to pace the room in impatient short steps.

"There is a financial panic in London, Paris, and Berlin—business is being brought to a standstill in all those capitals, and the chaos is likely to spread. The cables this morning give cause for the deepest apprehension. Where it will all end I cannot foresee. The country has been swept from North to South without any trace being revealed of these marauders, and the Canadian authorities report no favorable outcome of the search of their territory. But we must keep on, cost the country what it may. I can see no other help for it. I agree that our only chance of running the raiders to earth is to be fully prepared for every emergency, to be certain that no means of following the slightest clue shall be neglected."

He turned to me with a keen look, that yet passed over me as if to some greater audience.

"In the deciding of what the country must do to overcome such a terrible and bewildering menace," he said, "I cannot see that anything is to be gained by sticking close to rule and regulation. On the contrary, I believe that the enterprise you offer is better untrammelled. Therefore, you shall have every permit that is necessary, James Boon. I do not know from what point you will make a start, but you may have the luck—and I will venture that you have the intuition and skill—to light upon some clue which will lead to the clearing up of this mystery."

"Thank you, sir!"

His regard of me lost that absent air.

"No," he said, with a smile, "don't thank me. Thank rather your own proved value as a citizen. Or if you will have it that that is to be deprecated, thank two excellent advocates in your cause."

"Two advocates, sir?"

"Why, yes. My old friend, your father—and my secretary."

"Your secretary, Mr. President?"

"Would you like to meet my secretary? Very well, then—you shall." He went to a side door and called. "Kirsteen!"

And in answer, Miss Torrance appeared at the door.

"This is your advocate, Mr. Boon," said the President. "She has been pleading your cause ever since she opened your father's letter to me."

"I'm awfully grateful to you, Miss Torrance," I mumbled, as we shook hands.

"Uncle exaggerates," Miss Torrance declared. "I only pointed out that it would be foolish of the government to lose the help of one of its best airmen by sticking to silly rules. How was my Uncle Almeric when you left him, Mr. Boon?"

"He was wonderfully well, Miss Torrance. He sent every kind message to you."

"Dear Uncle Almeric! And how is my friend, Mr. Milliken?"

"Fine. He's in Washington with me."

"I must see him presently. And the *Merlin?*"

"Great!" I said. "She has three sisters now——"

"That reminds me of duty," said the President, opening his watch. "We must see this wonderful *Merlin*. Ah! Half-past eleven. The Air Secretary and his myrmidons should have arrived. Get your wraps, Kirsteen, if you are coming. We must not keep them waiting."

"Is the *Merlin* to be inspected at once—to-day?" I asked in surprise at this hustle.

"There will be some trouble if she isn't," said the President grimly.

CHAPTER X
A Secret Commission

IN the new *Merlin* I took up two crack pilots and a designer, while Milliken in the original machine carried the President, Miss Torrance, and a bunch of Delaware Bay, and there I fooled with the new bus, doing all the maddest stunts conceivable, until even the pilots with me were, I believe, a bit scared. The speed of the machine had amazed the experts, but her quick climb, that hovering flight of hers, and her astonishing qualities in manœuvre astonished them still more. Long before we were back on the banks of the Potomac and heard the enthusiastic verdict of the authorities, it was fairly evident that the *Merlin* design would pass to the government at my own price.

I spent the afternoon in the offices of the Air Board, going over the drawings of the machine and into costs with the designers there. Meantime, Milliken and two mechanics had gone by rail to Gardiner Bay to bring back the other two new machines, which were to be purchased by the government. When I rejoined the President and Miss Torrance that evening for dinner at the White House, I had in my pocket a bank draft for the handsome price which was paid for the *Merlin* design and the three new buses. The quick settling of the deal was due to the President, and when he and Miss Torrance and myself were alone after dinner, I tried to thank him. He put a hand on my shoulder in a kindly way, shaking me, and tried to stop me saying anything.

"Why, son," he said, "there no need for thanks. You brought along your design just when it was most needed, and we'd have been fools to let what Kirsteen calls red-tape hinder the concluding of the bargain. We ought to thank you publicly for giving us such a wonderful plane. But I have something for you——"

He produced an envelope and handed it to me. In it was a letter appointing me for special service with the air police, and mentioning Dan Lamont and Milliken as my assistants.

"Turn back the front of your jacket," said Mr. Whitcomb, and when I did so he pinned a little silver badge to the lining. It was the badge of the Secret Service.

"There!" said he. "Now, in the morning at ten o'clock you will go to this address." He handed me a card on which a direction was pencilled. "You have only to give your name to the doorman, and he will take you right to the man who nominally will be your chief. Don't bother to ask his name. It is seldom the same two days running. I want you to see him because there may arise an occasion when it will be impossible for you to report direct to me, and in that case you

will report to him. Ordinarily, you are responsible to nobody but Ben Whitcomb. Get that?"

"Yes, sir."

"Very well, then. Burn that card when you have memorized the address."

"I can do that now, sir," said I, and dropped the card into the open fire.

"Good," said the President. "Take Lamont and Milliken with you to-morrow."

"I shall have to get Dan Lamont on the phone right away, then."

"You'll find Dan Lamont at your hotel when you get back there to-night," said the President with a smile.

"Why—he's in New York!" I blurted.

"Not at all," he laughed. "He's on his way to Washington. We phoned him to come right off, and fixed a room for him at your hotel. At least, my secretary did."

I turned to Miss Torrance, and it came to me that she was just the prettiest girl I had ever seen. There was a little faint flush on her cheeks, and her eyes were shining. As if she were a little breathless with some excitement, her lips were slightly parted.

"It's mighty kind of you, Miss Torrance," I mumbled, "to take so much trouble for me. I don't know how to thank you."

"Don't try, please—it was Mr. Milliken——"

"Milliken!"

"Milliken and the *Merlin*—and, oh, the whole thing," she cried. "You two and that lovely plane—and that modest little man, Mr. Lamont. I envy you, all four. Next to being a man myself and joining you—the best thing I could do was to see you got your chance. You're lucky in your friends, Mr. Boon."

"I am that!" I said warmly. "Especially if I may number you among them?"

Then I felt my ears grow hot, and my neck go red at blurting this. It seemed so *gauche* after all she had done for me in friendship.

"That sounds ungrateful and silly," I stammered. "But I only wanted to hear it from you——"

She was a little bit rosy herself, but she held out her small fist in a frank way, and her serene eyes looked right into mine.

"Isn't that the American way?" she smiled. "To shake on it?"

"Sometimes," I said, and took her hand.

"I'm green with envy at your luck," she said, "though you deserve it, every bit—but I'm with you and the crew of the *Merlin*, heart and soul."

"That's just fine!" said I, and wished that kissing a girl's hand was still the fashion. Presently I took my leave of her and her uncle.

A Quiet Interview

SURE enough, when I got back to the hotel, Dan Lamont was waiting for me in the foyer. He immediately dragged me up to his room to look at the new kit he had bought. There were bags of it. He must have about cleaned New York.

"Say, Danny," I remarked to him, "what do you think you're making the trip on—a cargo-steamer?"

"Aw, Jimmy!" he pleaded. "It's just a few little things I thought we'd find useful——"

"I gave you a list, didn't I?"

"And I stuck to it, Jimmy—faithfully. I got three or four of everything you said. Then I got them to throw in some extra comforts for you and Milliken.

"The only extra comforts that Milliken and I will appreciate, my son, are maybe a few extra bands of shells, or another litre or two of gasoline. You'll have to leave five-sixths of this behind, Dan."

"I know I'm a goat when it comes to spending, Jimmy," he said. "I get so blamed enthusiastic."

"Well," said I, "when you bought this lot you certainly were in no fit of depression!"

He looked at the collection with a touch of despair for a minute, then he brightened up.

"Tell you how, Jimmy," he said. "We'll leave this stuff at our base and draw on it whenever we want new outfits."

I took my letter-of-marque from my pocket and flipped it over to him.

"Then," said I, "perhaps we'd better have the President alter this so that you'll be definitely commissioned Quartermaster General to the Force."

He read the President's letter with growing excitement, then danced about the room.

"Bully for you, Jimmy!" he cried. "Oh, boy! I knew you'd pull it off!"

I folded back my jacket and showed the badge.

"Consider yourself under arrest," I said.

"My!" he gasped. "You've gone and joined the Hicksville Temperance Cadets!"

So I put him in one of his own kit-bags.

Next morning Dan and I collected Milliken, who had returned to Washington late the previous night with the two new buses, and the three of us then went off to the address given me by the President. It turned out to be a modest little office in a back street. With its window-screen of colored bamboo beads and its brass plate on which the name had been made undecipherable with years of rubbing, it might have been the office of either an attorney or some old-fashioned importer.

We were led by the doorkeeper into the presence of a quiet, grey-haired man in a nondescript grey suit, who presently was chatting to us in a pleasant, flat voice that seemed to have no high lights to it. He spoke of nothing much except the weather and the prospects of business during the year.

"Business is likely to be a little upset by these raids," I ventured, apropos of the last subject, trying to give him a lead to our particular affair.

"Ah, yes," he said softly. "Most annoying—most annoying——"

He rose and held out a limp hand.

"Glad to have seen you, Mr. Boon—and you, Mr. Lamont—ah, Milliken," he said, quietly dismissing us. "Ah—if in your travels you should have any affairs with my firm, just look up the local agent for Aunt Mandy's Soap. You won't forget—Aunt Mandy's Soap. Buy a packet. We are running that line pretty strongly at the moment. Branches everywhere."

And with that he gently shepherded us out of the office.

"Well," said Danny, when we were out in the street, "what do you know about that? Aunt Mandy's Soap—buy a packet!"

"When in doubt we buy a packet of soap, and so find the nearest S. S. agent, I take it," said I. "Queer sort of fellow that—doesn't seem to have energy enough to wink——"

"Got us weighed up all right," grunted Milliken. "Daren't breathe but he saw it. Stringy guy, too—wouldn't like to fight him."

"Quit joshing, Milliken!" I protested. "Why, he's

like a wet rag."

"Don't you believe it," Milliken said stolidly. "Chest like a barrel. Arms like a monkey. Notice when the pencil rolled off his desk?"

"Not particularly. Why?"

"Never reached the floor," Milliken said, gazing at the sky. "Caught it without any noise. Quickest reflex I ever saw."

Which shows, I suppose, that if Milliken spares his tongue, he makes full use of his eyes. Danny and I had noticed nothing about the chief—as the quiet man in the back street might be called—except that he seemed bored to death with the mere effort of living.

Flying Orders

THE next ten days passed slowly. Milliken and myself were engaged in demonstrating the new *Merlin* to the government flying-men, and at the same time we had to oversee the refitting of the armament to the old machine, with other alterations necessary for our campaign. Dan Lamont was kept busy collecting stores, and on his own account he was making a selection of instruments which he thought might help him in solving scientific problems connected with the raiders.

With all three of us dead eager to be setting out, the delay was irksome, but we consoled ourselves that we were doing good work in putting the pilots wise to the efficient use of the machines, and that in any case it was better to wait for the next move on the part of the raiders.

The *Merlin* was fully ready for action by the middle of the week following our commission. The fighting top was fixed, and we had shipped all stores and ammunition. She carried four guns. We had dispensed with two of the smaller, so that we now mounted the fore and aft guns firing half-kilo shells, and a machine gun on either quarter. The arrangement was that Milliken or myself, whichever of us happened to be piloting, should handle the bow gun, while the other should work that at the stern. Dan Lamont, if not occupied in scientific observation, was supposed to turn his attention to the quarter guns, firing on the side handiest in any encounter. Incidentally, he proved an apt pupil under the instruction of Milliken and myself. We arranged the ammunition bands for each of the guns with great care, so that there would be no hitch in a crisis, and we put the spares where they would be handy for fitting at once.

Dan made it his job to render us as immune from the raiders' gas as he knew how. On his advice, we laid in a cylinder of oxygen, and fitted air-tight covers on all openings. The gun embrasures we filled with fabric, double pleated like camera bellows, and pierced to take the barrels and telescopic sights and fitting tightly to them, but flexible enough to permit a good arc of fire. The material was some close-woven asbestos stuff of Dan's own choosing, and he said it would not only keep out the gas, but would resist the heat of the gun-barrels after heavy firing. Our general idea was that should we get into action with the raiders we should immediately close all apertures, turn on a thin stream of oxygen, and do our fighting from a hermetically sealed cabin, a quicklime apparatus absorbing the carbon-dioxide.

Dan also had caused to be fitted under the hatch a bottle arrangement for automatically taking a sample of the gas, should we get into it.

During the fortnight in Washington we frequently met Kirsteen Torrance, and her uncle, the President, less often. She was inclined at first to think us a trifle slack about getting down to business, but the President persuaded her that we were doing the right—and harder—thing in waiting. Kirsteen took a deep interest in our preparations and was often in the *Merlin's* shed. She renewed her acquaintance with Milliken, who greeted her every appearance with his widest grin and delighted to explain to her the smallest detail of our outfit. We thought of her as our mascot.

We had an idea that the next of the raids would most likely come on the Great Lakes, and we decided that if we got no news by the evening of the first Sunday in May, we should make a hit-or-miss start for the Buffalo end of Lake Erie on Monday morning. News came to Washington by radio, however, that scrapped our plan at once. Dan and I were having tea with Miss Torrance at the White House, when the President came into the room with a flimsy in his hand.

"Flying orders, boys," he said. "Ships have been stopped to-day on the Cape route from England."

"At what point?" I asked, and got to my feet in a hurry.

"Northwest coast of Africa—between Madeira and the Canaries. By daylight, too."

"Come on, Danny," I said. "We'll get off right away. You'll be breakfasting at Funchal by five o'clock to-morrow——"

"Quick work!" said the President approvingly.

"Good-bye, Miss Torrance. Good-bye, sir——"

"Nay, nay," said the President. "Kirsteen and I will see you off. I'll ring for an automobile. We'll go together."

It was close on five o'clock when we took off from the basin by the Potomac, and a clear "Godspeed!" from a bright-eyed Kirsteen, a hearty "Good-luck, boys!" from the President, were the last words we heard as we set out on our venture.

Fruitless Searching

NIGHT came on us very quickly, for we were flying towards it, but while the light lasted Dan took a final lesson on the machine-gun from Milliken. With the dark we hit into a severe storm, which tested the *Merlin* very thoroughly. We had to climb high before we got out of a heavy driving rain, and when we had avoided that we came into electrical disturbances that played the very devil with our compass. It was tricky and difficult flying, for the lightning flashed above and below us, dazzlingly brilliant, and the atmosphere was terribly pocketed, so that we pancaked in a most sickening fashion. The smash of the thunder-clouds was deafening. There were times when only the fact that Milliken was standing on his feet persuaded me that we were not flying upside down. The disturbed area must have covered ten degrees of longitude, for we were in it close on two hours. At last, however, we passed out of the storm belt and could see the stars, and we were more sure of our course as a consequence.

Milliken and I spelled each other every two hours, while Dan, once the interest of the storm was over, slept peacefully. It was bright day when we sighted the Azores, though our clock showed only half-past two. Three hours later we were swaying gently on the swell in the very exposed Bay of Funchal.

Milliken cooked breakfast on the gasoline stove, then after a visit from the port authorities Dan and I went

ashore. We could get no official information about the raids that was worth considering. The Portuguese did not seem to care a red cent about the stopped liners. We had better luck at Blandy's, where Englishmen were in charge.

There were three acts of piracy on the Sunday, two Union-Castle liners and one belonging to the R. M. S. P. Co. being the victims. In each case the strong-rooms had been the objective, specie being taken from all three ships, and from a Union-Castle liner, which was homeward bound, the raiders had made a considerable haul in diamonds. The method of attack was simular on each ship: a sudden descent from the sky by the airship, swift and unexpected, and almost immediately the anaesthetizing of every soul aboard, close on a brief period of terrible panic among the passengers and crew. This last was a ghastly feature which had been missing from the night raids.

For a week, the weather being fine enough to permit a stay in the exposed harbor, we made Funchal our base, and we haunted the shipping routes from the coast of Spain to the Cape Verde Islands. But we had not the luck to sight our quarry. The following Sunday, while we were making towards the Azores, we intercepted a radio which told of raids on the north Atlantic shipping. We filled our tanks at San Miguel and cast a wide circle north into the sea lanes, flying until dawn on the Monday morning, without result. We returned to the Azores.

It came to Dan Lamont and myself simultaneously that these very islands would make an ideal base for all the known operations of the raiders, a notion that seemed to hit all the international searchers a little later. The seaplane base began to fill with British, French, American, and German machines, until by the middle of the week there was hardly mooring room for another bus. Meantime, Dan and I had gone ashore to test the Aunt Mandy's Soap scheme. We bought a packet, and sure enough made the acquaintance of an alert young American who had an office in a quiet back street. We did not need to introduce ourselves. He greeted us by name as soon as he saw us.

We enlisted his help for a search of the Azores, and while his dago myrmidons scoured the land, we examined every nook and cranny from the air. We raised no game whatever. Altogether, we spent another fruitless week in the Azores.

"Look here," the distributor of soap said finally. "There's a dandy landing-place for an airship on Madeira. I've just remembered it. A plateau, Lord knows how many feet up, towards the west end of the island. They call it the Paul da Serra—a barren place it is—utterly deserted. I'd give that the once-over, if I were you. I think you're on a false trail in this particular group of islands."

Well, we were just sick of the sight of all that unused ammunition in the cockpit of the *Merlin*, and our soap friend's description of the Paul da Serra certainly did make it look like an attractive landing-place for an airship.

It was nearly a fortnight since we had left Washington, May was more than half over, and we were still short of the fight we wanted. Anyhow, a faint hope seemed better to us than none, so we made for Funchal once again, with the intention of flying over the plateau on the early morning of the next day—Sunday, it was.

As luck would have it, this was the time chosen by the *Merlin* for her first breakdown. It was nothing much, just a fleck of enamel stuck, by some chance, in the jet of one of the carburetors. We could have flown all right, but Milliken and I did not want to get away with two cylinders missing. The locating of the trouble was enough to delay our start until long past dawn. It was seven o'clock before we got over the plateau and, as will be shown later, that fleck of enamel lost us an excellent chance. The Paul da Serra was bare when we flew over it—but it had been occupied not an hour and a half before.

It was the merest chance that sent us northward on patrol, for we had considered another flight to Cape Verde Islands. But northward we went. There are some would say we were urged by fate.

Battle at Last

OUR northward course had lasted barely half an hour, when far below and ahead of us there opened out a situation that had about it more than a touch of drama.

Broadside to our path lay a liner, spick and span to the smallest detail in the clear air of the summer morning, but so far away as to be a miniature ship. Almost nestling on her tall masts there hovered the long silver shape of an airship!

Dan and Milliken were doing small chores in the cabin behind me, and I found myself calling them—somehow in a whisper.

"By Christopher, old man," Dan breathed, "we've got 'em at last!"

Milliken's only comment was to pull the breech-cover off my gun and set the belt of shells.

"Keep high, sir," he muttered, when that was done, "and drop on them—*quick!*"

"That's the idea," I whispered. "Close all openings. Action as rehearsed."

"Right, sir!"

He and Dan quickly cleared for action, while I gave the engine as much gas as it would take. The *Merlin* leapt forward at dizzying speed. And now we saw what we had previously missed, that we were not alone in our hurry to the scene. From the east raced a warship, a plane-carrier we could see from her forward platform, and British from the fleck of white and red at her peak. Her distance from the liner could not have been more than sixteen kilometres, and the white surge at her stern and bows showed how quickly the distance was being covered. Neither the airship nor the cruiser, I felt certain, had spotted the *Merlin*. If the cruiser sent up a plane, we would have to be spry to get in the first shot.

"Stations, boys!" I yelled, then, for I saw the airship begin to rise from the masts of the liner. "I'll dive below her, Milliken. Burst her as we pass below!"

"Aye, aye, sir!"

Down, down, down we streaked—quicker than ever kestrel swooped. My shoulder was snugged in the piece of the gun, and my finger was trembling at the trigger. Up, up, up to meet us came the mass of the airship till her side loomed like a great wall. I flattened then, and every fibre of the *Merlin* protested at the strain. Suddenly my gun blatted as of its own volition. I could just glimpse the gouts of flame as the shells burst in the grey side of the airship, before I had to dive under her—then behind me I heard Milliken's gun give voice in a prolonged roar.

The enemy must have risen quickly, for I found the *Merlin* still a good height above the level of the sea. The speed of the dive—done with the engine almost

full throttle—took us far beyond our quarry, since I could not turn without depriving Milliken of his shot. I pressed the foot-bar for the turn, and Danny loosed off excitedly.

"Hold your fire, Danny!" I yelled. "We're not near enough!"

"Hell, Jimmy!" he shouted. "Gimme a chance, will you!"

Despite my climbing turn, we had lost the level of the rising dirigible and we now had to climb at a steep angle, but I set the *Merlin* to the task, all out. She answered willingly.

High above us floated the silent grey shape of the airship, and it seemed as if she were disdainful of the worst we could do her. No answering burst of fire came to us, no sign that anyone moved on her. She was uncannily still. It was amazing that she still could float level, for at least three of my shells had taken effect on her envelope, and Milliken was not the man to expend ammunition unless his target was plumb on the cross-hairs of his gun-sight. But she floated horizontally, rising quickly, apparently unharmed.

We were gaining on her, I thought, but the angle at which we had to climb seemed likely to take us clean under her, so I gave her a burst of shells before turning to spiral. As we came round, Danny's gun stuttered out long roll—it must have been nearly a drumful—and presently Milliken's heavier metal took up the ground bass of the chorus, till the cabin was clamorous with the roar, through which came the thin tinkle of spent shells falling. Still no answer came from the enemy.

When the spiral brought us round so that the grey shape filled the field of my gun-sight again I began to notice that the ship floated in a thin pinkish haze that shimmered, as one sometimes will see the heat do as it rises from a hillside in summer. It was a curious effect, curious enough to hold my attention even in the excitement of that moment, and I called Danny's attention to it before opening fire on the target. But as I pressed the trigger, the haze enveloped the *Merlin* herself, and a sort of dancing refraction spoiled my aim.

"Wonder if that haze has anything to do with their gas?" said Dan in my ear as we swung round once more, and he added something that was drowned by the noise of Milliken's gun.

Just at that moment, to my intense disgust, the engine of the *Merlin*, which had been working beautifully, gave a despairing whine and petered out. I felt the bus slip back, and I flipped up her tail so that we came into a head dive. As we came down the engine picked up and failed once or twice in an odd fashion, till at last—when I had got the bus into her steady hovering descent—it stopped altogether. We alighted on the face of the sea.

At once Milliken sprang for the engine hatch, but Dan Lamont seized him by the arm.

"Don't open anything yet, Milliken!" he yelled. "Not yet—we're still in the haze. It might be the gas!"

"Gas—hell!" said Milliken. "I want to see what's happened to the engine!"

"Jimmy!" Danny cried in distress, as the mechanic gently put him aside.

"Just a moment, Milliken," I intervened. "Let's think this thing out—Mr. Lamont may be right."

"Right, sir," said Milliken, and stood aside at once.

Escape

THE pinkish haze lay about us as we rode the sea. To the north of us the liner still wallowed in the troughs, and the British cruiser was coming up hand over fist from the east. The airship floated motionless in the sky to the south of us, seemingly none the worse for our attack, nor making any attempt to get away. My glance fell on the clock attached to the control-board.

"Mighty!" I exclaimed in surprise. "It's hardly ten minutes since we sighted her!"

"What's to be done about the engine, Mr. Boon?" Milliken demanded.

"We'll be guided by what Mr. Lamont says, Milliken. What's your notion, Danny?" I asked.

Dan was on his knees working the bottle for sampling the gas. He looked up, then rose.

"I've worked the bottle," he said, "but I can't test the gas here. If this haze is what I think it is, we can't open anything for long without being doped. This is what I say. It's damned unscientific—but I don't believe in tests even on white mice. Let me open a port slightly, and take a whiff—I'm certain the raiders are averse to the use of anything lethal. If I keel over, shut the port quick and bung my nose up against the oxygen tube, and leave me to recover. That will be enough if I don't show signs of choking——"

I was taken aback at having to sanction such a proceeding, but there was no time to argue the matter.

"You're O. C. Stinks, Danny," I said quietly, "and what you say goes. Is that the order?"

"Sure it is," said Dan, a little breathlessly.

"Right," I said. "If I didn't think—I pray God it's nothing worse than the usual gas——"

"I don't see why they should change their tactics now," said Dan. "If I don't come round, try the ether injections I showed you. Stand by, boys."

He went quickly to a porthole and undid the screw, then swung the cover aside and stuck his head out.

"It's the ga—gas—allri'—" he muttered with a funny little smile. Then he seemed to crumple, and I caught him as he fell. Milliken whipped the cover back into its place and threw in the fastener, while I gently laid my friend down with his fair head against the oxygen nozzle.

Whether it was seeing Dan keel over in that fashion, or that Milliken and I got a whiff of the gas, I can't attempt to gauge, but we both had the symptoms of being pretty sick. I know that when my mechanic went to fetch a pillow to put under Dan's head, he reeled and went white, while I was as dizzy-headed as could be. Dan was breathing quietly and, despite our anxiety, there seemed no need to inject ether or try artificial respiration as he had showed us.

"Pluck, if you like, sir," Milliken muttered, and very gently he lifted Dan's head and put the pillow under it. That was all we could do, for Dan's shirt collar was open and his clothing loose. We made the little fellow as comfortable as we could.

We were just rising to our feet, Milliken and I, when the cabin shook to a distant thud. A wispy ball of smoke was drifting from one of the barbette guns of the cruiser, and, as we watched, a string of bunting was broken out on her signal halyard.

"Look!" said Milliken. "There's a plane up!"

Sure enough, while we had been attending to Dan, the cruiser had catapulted one of her machines into the air, and it already was climbing after the airship.

"Reel out the aerial, Milliken," I said. "We might pick up a message or something."

I switched into the open receiver as he let the wire down, then we watched the progress of the fight. The

aeroplane was climbing steadily and cleverly after the dirigible, which was making no attempt to get away, but as the pink haze still lay about the enemy, I saw that the men in the open machine would be doped before they could attack. I sprang to the radio to warn them if I could—for the aerial was a bit short for sending, since we were afloat—but just then a message came belting across the phone:

"His Britannic Majesty's ship *Brilliant* to the damned pirate: Surrender!" came the voice. "The game's up!"

Immediately came the calm reply.

"Airship *Ark of the Covenant* to H. M. S. *Brilliant*: On the contrary, the game has not yet begun. Don't be absurd, *Brilliant!*"

A second machine flashed off the cruiser's stage, and began to soar after the other. I switched into transmission.

"U. S. seaplane *Merlin* to H. M. S. *Brilliant*," I shouted. "Keep your pilots out of the pink haze round the airship. It is the sleep-producing gas!"

"Thanks, *Merlin*," came an English voice. "That was a jolly good try of yours. Hope you aren't damaged?"

"Don't know yet," I said.

Up above us the first plane opened fire with a machine gun. We could hear the "rat-tat-tat!" of it. But as the sound came, and we heard the warning go out from the cruiser, we saw the plane enter the fringe of the haze. Only for a second after that was it under control. It stalled, then got into a spinning nosedive, righting just before it crashed flat into the sea. As it crashed, its companion also went out of control on a sudden, though it had not reached the haze. Then it righted, to go gliding down after its fellow.

"That wasn't the gas," said a voice behind us, startling us. "It was some other piece of devilment."

It was Danny, who stood behind us, fully recovered. Milliken and I each grasped a hand of his, silently. Thud-thud! The anti-aircraft guns of the cruiser were speaking. Thud-thud!

"Cease fire, you idiots!" came the voice from the airship. "Stand by to pick up your airmen, unless you want them to drown. We don't want to sink you just yet."

"Sink and be damned to you!" spluttered a British voice.

"Tut-tut!" the calm rejoinder came from the airship. "Don't be so melodramatic. You sound like a penny novelette. Stand by and pick up your men. The first lot are unconscious. Or you, *Merlin*—you do it. Hurry! Your engine is all right and you'll find your area free of the gas."

Certainly the pink haze had gone from our vicinity.

"How about it, Danny?" I asked.

"Take their word for it."

Milliken had the hatch open on the instant, and was down on the floats without harm. I gave him contact, and he swung the propeller. The engine picked up as if there had never been anything wrong with it.

As the mechanic climbed in through the hatch and we were taxiing along to the rescue of the drowned airmen, we saw the airship assume an angle of forty-five degrees and mount at incredible speed far out of range of the now silent guns of the cruiser.

Presently she was lost in the upper air, apparently heading for the African coast.

We found the pilot and observer in the first machine inert and unconscious, stretched out in their cockpit, which was filling fast. The crash had sprung all their timbers, and we were just in time to drag them out on our floats before the water-logged plane turned her nose down, to sink with the weight of its engine. We hoisted both men into the cabin of the *Merlin*, and put their heads against the nozzle of the oxygen cylinder. Then we went on the second machine, a big, amphibious, two-engined de Hamiville fighter.

Here the crew were in better case. They had made a good landing in the sea. They were afloat and cursing their engines, over which they were clambering in an endeavor to locate the trouble that had brought them down. We persuaded them to reconnect their leads and flip over their propellers. To their intense surprise, the engines acted at once.

CHAPTER XI

Fastening the Net

IN a little the cruiser came smashing through the seas to us, and a casual hail invited us to breakfast. With the big fighter, the *Merlin* was hoisted up to the landing-platform and snugged down. The air mechanics of the ship took charge of Milliken, and Danny and I were besieged by the commissioned officers. The doped airmen were still unconscious when they were taken from our cabin, and, on Danny's advice, the surgeon ordered the sick-bay stewards to put the two to bed to sleep off the effects of the gas.

The cruiser, meantime, had come alongside the liner, and in an excellent display of seamanship had grappled her. It was the *Parnassic* all over again. Sleeping people were huddled about her decks, nor could any efforts of the boarding-party bring them to consciousness. It was decided to take the liner in tow to Madeira, and the bluejackets quickly bent a cable from ship to ship. By the time Dan and I had stepped down to the wardroom for breakfast, the liner was being dragged astern.

At breakfast we had a long discussion with the sailing and flying officers, and we were brought to the conclusion that the raiders had, in addition to the gas, some secret means of disturbing the engines of planes. There was the evidence of the two machines forced to come down in the raid on Paris, these, it will be remembered, like the *Merlin* and the big de Hamiville, showing no lasting engine trouble. Dan's theory was that the raiders had a ray which affected the electrical circuits of the engines.

He also had an idea that the raiders had some way of controlling their cloud of anaesthetizing gas, a notion that was supported by the officers who had been watching the show from the cruiser's fire-control top. The pink haze had moved about from position to position in too definite a manner to be haphazard, and Dan and the officers were of the opinion that the gas had been purposely swept from the vicinity of the *Merlin*.

Dan, while the discussion was forward, was back at his old trick of shaking loose change in his cupped hands, but from this demonstration of his interest and excitement he drifted into a mood of silent cogitation, which deepened the wrinkles above his snub nose and gave him the air of a thoughtful child.

After breakfast, Milliken and I went over the *Merlin* on a general overhaul, and found her none the worse for her straining. We took off from the deck of the cruiser just before nine o'clock.

"Where now?" asked Danny.

"Mogador," said I. "We owed the raiders a start for their humanity. They certainly play a clean game.

It would have been easy for them to have left the *Merlin* in irons with their gas. But we're going to have another cut at them. First, we must refill our tanks at Mogador, and get a message radioed from the station there to the President and to Sir Thomas Basildon."

"But, Jimmy," Dan objected. "If they can stop your engines once, they can do it again. How are you going to get over that?"

"I'm not quite sure," said I. "I think the notion is to get well above them, then it doesn't matter whether the engine is stopped or not—a glide will do all that's required. Next time, I'm not going to waste ammunition on the envelope—they're using some uninflammable gas—that's plain. I'm going straight for the stern engines. Did you notice that the airship's steering was done by them?"

"No."

"Fact, all the same," Milliken put in. "The whole of the stern cabin works on a swivel."

"It's so, Dan," I said. "And that's where I'll bust them, or bust ourselves in the attempt. We might have the luck, too, to take them sitting."

"How do you get there?" Dan demanded.

"It's my notion that the airship we attacked works from a base at the back of Morocco. I'm banking enough on the idea, anyhow, to advise Sir Thomas Basildon to get as many scouts concentrated round the coast as he can. If the airship comes out again, we may be able to crowd so many planes round her that the ray you imagine will have more to handle than it is able. In any case, the place wants going over thoroughly."

(To be continued)

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The Planet's AIR MASTER

By Edward E. Chappelow

The huge craft was being pushed down the runway by the powerful catapult at an amazing speed. A moment later it was cruising free of the landing station, and the motors were pulling the monster up to the higher altitudes.

CHAPTER I

An International Crime

"YOU mean to say that you can't stop the air robberies on our New York-London route?" said Frank Wallace, assistant manager of the International Air Line, as he looked across the desk at his visitor. They were in his office on the thirty-sixth floor of the Aviation Building in New York.

"No, of course not," answered the other, "I mean no such thing, I merely want to say that it's a great task, and one that has to be approached with great care."

Albert Riel, the speaker, was known as the cleverest detective of Scotland Yard, and had been assigned to the task of tracking down the daring air raiders that were preying on the rich passengers and cargoes of the I. A. L.

"Well, I suppose you must do it in your own way," replied the air-line official, "but if we are not free of these air bandits soon, the line will have to cease operations on that one route. Why, we're the talk of the world. Our own company detectives can't seem to do a thing, for they don't even know how the ships are brought down onto the ocean. It is a mystery worthy of the attention of the best detectives on earth. The liner flying at a great height, suddenly starts to coast downward, until she is resting on the waves with her motors idling. Then Mr. Bandit drops out of the sky in a little white plane, and walks off with whatever he wants. The Atlantic Police have often sighted the raider planes—"

"Plane, not planes," corrected the sleuth, "for only one has been seen so far."

"Well, plane, then, and as I was saying, both the American and the British police planes have seen the bandit ship, but they never seem to have been able to get a single shot at it It's no wonder that the papers ridicule the Atlantic police forces. There has been a total of one hundred thousand dollars offered to the party that downs the plane or learns the location of its headquarters.

"Last week we sent a police plane along with one of our air cruisers; the ship's speed was reduced to less than half of its usual speed so that the small plane could keep up But, somehow or other, the police plane was led off on an imaginary chase, while the raiders brought down the liner in the same mysterious way, and got away with the Government's shipment of gold, that was being rushed to France. We had eight armed guards on board, and yet one solitary unarmed bandit walks off with the money. I tell you, Riel, it's getting to be an international affair, for if they can successfully repulse all attempts at capture and keep up their work, robbing our liners, then what could they do if they picked on the whole world in general? Suppose they—"

"Suppose you give me a chance to talk," quietly cut in the Englishman, "and we will get started all the sooner, for time is valuable as you are well aware. Now I'm here to advise you to ship no more valuables at present, until we are able to stop the raids."

EDWARD E. CHATTELOW

"We're carrying very few articles of great value; in fact there are few who will risk their treasures or their lives, either, on our ships, although the bandits have harmed no one yet."

"Well, that is good news," the Scotland Yard representative said as he reached for the cigar box on the desk. "You think, perhaps, that I have just been assigned to this work, but as a matter of fact, I have been secretly working on this case since the raids on your line first began, as our master criminal is well aware. Therefore I know what we are up against. But first I want to tell you that we are dealing with the most scientific crook that ever existed; but I cannot discuss the case with you here, because we are exposed to our foes."

"What! You can't talk to me privately in my own office?"

"You seem to forget already what I just said; that we are probably dealing with the cleverest scientist living, and I have every reason to believe that he knows as much about what happens in this office as you do. How does he know where to find your liners when you change schedule without notice, sending them out hours ahead? He knows all about your business—"

Riel stopped suddenly in the middle of the sentence, and gave a slight start as he looked down at his wrist watch. The expression on his face changed to one of alertness, but it was only the fraction of a second before he recovered his former poise, and only a close observer would have noticed anything unusual. However the incident did not escape Wallace. . .

"No, I don't know what we can do at present," Riel continued, a slight look of worry passing over his face. "We're already using double the normal number of police planes, among them some of our swiftest ships, to patrol along the route of your air cruisers."

Frank Wallace looked at him in astonishment. Could it be possible that this great detective had no idea of how to cope with the situation? He was about to voice his indignation, when a look from Riel warned him that something was wrong. He was instantly

HERE is an extraordinary a story as has ever been our good fortune to read. For adventure, science, aviation and general hair-raising incidents, you will have to go far to match it. It is one of the stories that will draw a great deal of comment from our readers on account of the daring of the author in portraying the trend of our progress in aviation.

Yet, there is nothing impossible or improbable within the entire story, not even the marvelous rays used by the arch-villain.

When it comes to science as applied to aviation, we have not as yet scratched the surface and the most marvelous things are as yet in the dim recesses of the future. Therefore the most improbable predictions of our present-day authors will be commonplace a hundred years hence.

alert, straining his ears to detect any sound that would betray the presence of a third party. But only the usual sounds of city life could be heard. The humming of planes as they passed his window, the never-ceasing tread of feet in the corridor beyond his office, the faint sound of the changing plates of the stock market announcer on the wall, but no suspicious sounds could he hear. What had the detective heard? Was there really someone spying on him? Wallace paled a bit as he thought of it.

"It is twelve o'clock," Riel was saying. "Suppose we take a short walk."

An Unseen Shadow

THE air line official made no reply. But, rising, reached for his hat. He realized that there was something wrong, for he had seen the warning look in the other man's eyes, and he decided that the best policy was to remain quiet for the present.

"Sub level three," Riel informed the elevator attendant as they stepped onto the car; and a few moments later they were walking along the lowest street level.

It was the noon-hour and the towering buildings of New York's downtown area were pouring their streams of humanity onto the three street levels—crowding them to the limit. Especially the lower street, which was built for pedestrians only. Here, the wonderful window displays, the bright lights of the theatres, the stores, and dining-rooms added their brilliancy to the countless electrical lights of all colors and patterns, and attracted the crowds from all parts of the great city. It was the White Way of the mighty metropolis. The heavy traffic assigned to the second level, could scarcely be heard from below, due to the excellent sound and vibration-proof construction of the streets. The present street system was a great improvement over the old style of having everything on one level. For now merchandise was delivered to the buildings by a sub-surface freight railway, that connected all of the main buildings, and provided them with an efficient method of receiving and shipping the constant streams of material. The aerial landings on the roofs of the buildings also provided speedy means of obtaining service for both passengers and freight.

There was little said as the two men made their way through the crowd for about two blocks, and entered a dining room. Wallace noticed his companion steal another look at the wrist watch as they approached a corner table furthest from the entrance. He wondered what curious contraption that innocent-looking wrist watch could be, and how it could inform the wearer of the presence of a spy.

"We can sit here and talk," Riel remarked removing his hat, "but keep off the robbery subject, for we are not only being watched but overheard as well."

The official gazed uneasily around him at the occupied tables, but no one seemed to be paying the least bit of attention to them. He almost decided that his friend was taking the precautions simply as a measure of safety, and that he had no proof of any one shadowing them. But, then, that mysterious wrist watch must be serving some purpose; and he tried to puzzle out how a wrist watch could be fixed up to tell of the presence of a person who is close enough to overhear them.

"What makes you think we are being watched?" he asked.

"I don't think so I know it, see this on my wrist?" the detective exhibited the watch for inspection. "It's a wrist watch, yes, but the second hand is not a second hand, it's a small compass needle. Inside the case, besides the works that drive the hour and minute hands, I have a coil of fine wire, located so that when it is energized it will swing the needle to a position pointing to the figures six and twelve on the face, and freeze it in that position. When no energy is passing through the coil the compass needle will swing free—controlled faintly by the magnetic lines of the earth. Now I'll tell you something that I have not told you before, the bandits—"

Riel's serious expression quickly changed to a smile, and Wallace again saw the warning look in his eyes. So for the next few minutes they talked idly, remaining off the subject of interest. Wallace was not slow in catching on, he knew that in some way the watch indicated the presence of a foe. But who or where the spy was he had no idea.

The detective's arm was resting on the table, the watch almost concealed by his cuff, but not enough to hide the compass needle from view. The needle was pointing straight at the stem of the watch, or the figure twelve, with its north pole. But another look from the sleuth caused Wallace to take his glance away from the needle. He noticed that his friend looked at it out of the corner of his eye, while he carried on the conversation. Suddenly the needle was released, and swung freely around as it sought to align itself with the magnetic north and south poles of the earth.

"I must give you credit," Riel smiled across the table, "you were not slow in catching on."

"Suppose you let me know what the mystery is," was the reply, "before that confounded thing swings around again."

"Well, they're using a vision ray on us, and this detects the ray."

Wallace's face paled. "Good God, man, you don't mean that they have been watching every move I've made for months back?"

"And listening too, for the ray picks up sound waves. Now before we go any further put this on."

The detective drew a second watch from his pocket and passed it over the table. "And when you see the needle freeze, remember that you are being watched as closely as I am watching you. And be careful how you look at your indicator, because while they're watching you, they may notice you looking at it, and it's one thing we don't want them to find out if we can help it."

"I understand," replied the other, strapping on the watch, "and you can depend on my using every precaution."

The Air-Line Station

"IT is of no use trying to discuss the case here," Riel continued, "for we are being watched too closely with the ray. There's only one place where we can talk in secrecy, and that is at my home in London. Now, you return to your office and make necessary preparations for a few days' stay abroad, and meet me at the air-line station at six A. M. tomorrow. We'll take your morning ship across."

"The first doesn't leave until ten o'clock, for we've cut down to four trips a day. Business has become completely dead since the public became frightened."

"Sh—!" A hiss from Riel, and he knew that the ray was on them again. A cautious glance at the watch verified it.

"Then order a special for six A. M.," the detective

quietly replied. It is my best chance to get some important papers over to London, without the risk of losing them."

Again the ray left them, and Riel's face became serious. "Listen, Wallace, I'm going to try and get some important papers across that our master criminal is after. That's why we want to slip away unnoticed."

"Then why did you tell me about the plans when the ray was on? He heard you."

"I will explain that later, but now I have to leave you before the ray comes on again. I want to lose it in order to get my papers from the bank vault in secret. That ray can penetrate walls and see beyond them. I will meet you at six in the morning, in the upper waiting-room of the air station."

With that he rose and hurried from the room, leaving his friend wondering what the plans were that he was guarding so well, and why the master criminal was attempting to get them. Above all he was concerned with what they had to do with the raids on his air cruisers.

The International Air Line had the swiftest transatlantic transportation system in the world, connecting Paris, London, New York and Los Angeles.

The long distance flights were made at a high altitude—the gigantic triple-deck planes being automatically guided along magnetic beams at an amazing speed.

The landing stations were built on, or rather suspended between, four gigantic steel towers forming a square. Built near the top of these, the station consisted of two runways, or landing tracks, with a section of the station rising up on each side of them, and a third projection between the two tracks. The three sections were of equal height and the roofs perfectly flat and level; for the huge wings of the ships passed over them, clearing the flat tops at a close margin. The whole station structure when viewed from above resembled a huge wide letter "E," lying on its back, and held up in the air by four long legs. The three station sections running the length of the runways, were each three floors above the tracks, and each connected with them by three landing platforms, one above the other. The section of the station, located between the tracks, was used by the cruisers in both runways for discharging passengers and baggage, while the outer buildings served to load the liners in their respective runways.

The upper deck of the liner held the first-class passenger cabins, the front end of which consisted of an observation compartment. Here, large, low windows formed a half circle around the front of the deck, offering an excellent view of things below, although the ships, during the long flights, usually flew at such a height that there was little to see during the trip. The entire deck, with its luxurious furnishings and trimmings, its comfortable sleeping cabins and faultless dining service, offered all the comforts and accommodations of a first-class hotel. Connection with the decks below was established by means of a noiseless floor selector or elevator; while a second elevator connected the dining room with the kitchen on the lower deck. The second or intermediate deck of the air cruisers held the second-class compartments, and was equipped somewhat similar to the first-class section above. The lower floor contained the baggage rooms, crew's quarters, operating and control rooms.

The triple-floor station platforms running along both sides of the two runways, served to connect the baggage and waiting rooms of the station, with their respective liner decks. Off the two upper platforms the ticket offices and waiting rooms were located, while the baggage and supply rooms were on the level of the lower loading-platforms. Guide rails passed along the outer edges of the loading platforms, and small rollers on the ships engaged these rails, guiding them through the station; while skids or projecting strips on the bottom of the cruisers slid into slots in the bed of the runway that were fitted with rollers, reducing friction to a minimum. This was of great benefit in starting out from the station, enabling the hydraulic catapult to give the cruiser the necessary speed to leave the runway. The smooth, quick stop of the liners was accomplished by means of hydraulic brakes placed along the platform edges, just above the guide rails. These brakes, when applied against strips of special material on the sides of the cruisers, were capable of quickly stopping them, even when they entered the station at a high speed. But there was little variation in the landing speed, for the ships, when approaching the station, were automatically guided in by a magnetic landing beam. These beams, similar to the ones used to guide the liners over their routes, were set at a level with the runways, and not only enabled them to hit the runways accurately, but also adjusted the speed of the ship.

Five powerful, high-speed electric motors were mounted on each wing and connected directly to individual control panels in the control room. Therefore, if one motor went out of order during flight, it could be cut out of service by the operator without interfering with the others. The power was furnished by twin generators, each driven individually by a gasoline engine, and each set capable of operating the ship independently in case the other developed trouble. The complete power system was such that there was very little chance of a forced landing being caused by engine trouble.

A group of colored signal-lights was located on both upper and lower sides of each wing, while another group was attached on the nose or front end. All of these were controlled from the operating room.

CHAPTER II

Ready to Start

THE location of the control or operating room was in the front part of the lower deck. The complicated mass of automatic electrical control equipment was mounted on a number of slate panels, forming an arc which extended from the front of the operator, around on both sides. The panels were about two feet from the floor and about four feet high, leaving room below for the hand and foot levers of the emergency manual control. Directly in the center of the panel board was a number of meters. The largest was the velocity meter controlled by the speed indicator which was attached to the outside of the ship. The velocity control was operated by the automatic radio control, and its speed setting by the altitude regulator, which was adjusted to operate when the meter reading was at a certain point. This made it possible to keep the altitude control unit accurately timed, which was an important thing. On the right of the meter panel, was the automatic radio control, consisting chiefly of a large number of electro-magnets, fixed coils and sensitive relays. When the liner entered the field of one of the magnetic beams, the automatic radio control was thrown into

action by the beam, and automatically kept the craft in the center, or densest part, of the beam.

When Mr. Wallace stepped from the elevator after a rapid ascent to the I. A. L. station, and entered the waiting rooms of the eastbound track, he found his friend waiting.

"Here so soon?" was Riel's greeting. "Well, we've got almost twenty minutes to wait."

"No, the special should be here soon, because I ordered it for 5.45."

Just as he spoke, a bell rang and the train announcer lit up:

SPECIAL 47L. N. Y.-LONDON. O T. 5.45.

"On time," added the official, looking up at the announcer. "It must be coming in on the landing beam now."

"How far out from the station does the landing beam extend?" the sleuth asked.

"Ten miles. Our landing beam projectors are located below the runways here. One beam is thrown east from the westbound tracks, the other extends the same distance west to guide the eastbound ships in."

"But when the ships leave the upper beam and drop down, entering the landing beam, is this done by manual or automatic means?"

"Automatic," replied Wallace. "We have a beam crossing the upper one at a certain distance out, approximately thirty miles from here or twenty from the end of the landing beam. When the ship hits this cross beam the radio control is thrown out of contact, which causes the velocity regulating unit to also throw out, shutting off the motors, while the altitude regulator is thrown into its lower setting, which is the height of the landing beam. The liner then glides down at a comfortable angle until it enters the lower beam. Here the altitude regulator rights it, and the beam causes the radio control to operate and throw in the velocity unit, but in a lower speed setting. The motors drive the cruiser along the lower beam at a greatly reduced speed, guided automatically by the radio control."

"Sounds all rights," Riel answered, "but what provision have you made for failure of the ship to strike the lower beam?"

"We have the ship equipped with a complete installation of manual control equipment, by which the pilot can lower the landing wheels and bring the craft to the emergency landing fields in case the automatic equipment fails; and as to missing the lower beam when coming down, that is almost impossible. For with the cruiser going at a definite speed and in a definite direction, and the decline started at a certain point, it is easy to see that it will arrive within a reasonable distance of the beam area. Of course, the air currents throw it out some, but the pilot can easily make the slight adjustments necessary by the use of the manual controls. For the area in which the ships strike the lower beam is well marked by day and plainly illuminated by night. The liners also carry a special radio beam indicating unit, used when the weather makes the guiding lights invisible. But suppose we step out on the platform, our ship should be here by now."

The huge cruiser could be seen approaching about two miles west, on a level with the station, and it was scarcely more than two minutes before she entered the runway, sliding in between the guide rails with amazing accuracy, and coming to a quick but smooth stop in the station.

To one who had never seen the air liners enter and leave the station, it was indeed an interesting sight to watch the approach of the huge triple-deck cruiser with its monstrous wings. But once inside the station, only a partial view of it could be seen from one place. Because of the platforms passing close to the sides of the ships, only one deck could be seen from any one platform or waiting room.

"There is no crew on this ship except one operator," the official informed his friend, as they stepped into the upper compartment. "We are carrying nothing in the way of baggage, and I left even the kitchen crew behind, to be sure that we would not be disturbed on the trip. But I have a lunch here in my hand-bag in case we get hungry before arriving."

"Your precautions were hardly necessary," smiled the detective, "but nevertheless it is just as well, for we know who is aboard."

Scarcely had they seated themselves, than the doors of the three decks slid shut, the hydraulic brakes were released with a hiss and the huge craft was being swiftly pushed down the runway by the powerful catapult, gaining speed at an amazing pace. A moment later it was cruising free of the landing station. As the ship left the runway, a pressure contact on the side was released automatically, throwing the altitude control unit into operation in its high setting. Simultaneously the velocity regulator was automatically thrown into contact, and the motors were soon pulling the monster rapidly up towards the higher altitudes.

Ready for a Hold-Up

THE oxygen distributing system was already in use throughout the ship, relieving the difficulty of breathing in the thin upper atmosphere. The gradual leveling of the liner indicated its approach to the upper magnetic beam, and as the altitude regulator cut out, the beam caused the automatic radio control to make contact, throwing the velocity regulator into its high speed setting. Under its control the battery of motors began to increase speed, until the cruiser was heading east at the amazing speed of four hundred miles an hour.

"Did you notice any disturbance on your wrist watch while we were in the station?" Riel asked, as the cruiser gained speed along the beam.

"No, for the time being I forgot about it," was the reply. "Do you expect them to stop us this time?"

"Yes, I do." Riel shook his head. "I expect them to bring us down before we get over. It is an ideal day for them, dull and cloudy, making it easy for them to get away."

"I doubt it," Wallace said. "I've got extra police on the job to-day, just hoping they will make a try, and the pilot has been told to sound the radio alarm as soon as he finds the ship leaving the beam."

"When did you give these instructions, when you ordered the special?"

"Yes, I phoned the air sheds from my office and also gave orders to have the radio alarm inspected carefully, and the pilot well instructed as to its use."

"And how many pilots have set off the alarm during a robbery?"

"Well—"

"Quiet," hissed Riel, as he saw the needle of his watch freeze stiff, "I'll take the papers from my brief case," he continued in a natural voice, "and hide them under my seat in case we're held up. Can't run the risk of losing them."

A moment later the needle swung freely, and the men were free to talk.

"What was your idea of talking about hiding the

papers?" Wallace asked.

"Just to prove to you that they are able to hear us as well as see us. There is no doubt but what we'll be brought down, and to prove my words you'll find that the raiders will look under the cushion of my chair, before searching my case, although we will not put the papers under the chair cushions. But you haven't answered my last question yet. I want to know how successful your radio alarm is."

"So far it hasn't been very successful," admitted the air-line official. "In fact only two pilots made use of it at all during robberies and those times were after the raiders had thoroughly robbed the liners and left."

"And on another occasion one of your police plane escorts left the liner and flew off on a false chase of the raiders, while the ship was brought down and robbed?"

"Yes," Wallace nodded. "Of course we can hardly blame the police, if they see a chance to chase the raiders. But there is one instance where the bandits used two planes, one as a decoy to lead the police away and the other to rob the ship."

"No; you are wrong, Wallace, for I know that they are using but one ship."

"Impossible!" insisted the official indignantly, "for the police chased the raider over one hundred miles, and as soon as they lost sight of it they returned to the cruiser. That plane could not have got back and committed the robbery before the police returned."

"Now listen," Riel bent over towards his companion, "I'd like to tell you all I know about this case and explain some of these things for you; but to do so would most positively spoil my plans, but later you will know. Now watch your indicator close, and warn me by a cough if the ray comes on. I'm going to hide these papers and I don't want you to know where I put them. Turn your back this way. There now, remember, watch that indicator closely."

Riel quickly unbuckled the brief case, removed the papers, and going to the other end of the room, slipped them behind a safety-first cabinet on the wall, and quickly returned to his seat.

"What are you up to now?" his friend inquired.

"Just this. I thought when I first took up this case, that the vision ray and the means of detecting voice waves were the most powerful instruments our raider had. But later I found that he was using some mysterious force that we are yet unfamiliar with. If I am right, then, this wizard is merely playing with your cruisers, perhaps to introduce himself in a mild way to the world, and that he has power enough to whirl every man of this earth around his thumb. Unless I am wrong, he can make governments do what he wants them to do. In a few minutes he can start one-half of the world fighting against the other half and can make bank presidents bring their loads of gold to his door without knowing that he exists."

Frank was by this time staring at the other in amazement

"You mean that he can create all this havoc and not give himself away?"

"His vision ray might give him away, but the other power will keep anyone from using the clue to trace him down," continued the sleuth. "I'm warning you, Wallace, we're taking a chance, for if he ever takes a notion to—"

"We're going down," Wallace exclaimed, his voice shaking with excitement, as he felt the nose of the ship tip downwards.

"Sit still," cautioned his cool friend, "leave it all to me and don't talk."

The faint hum of the motors had ceased and the cruiser was gradually losing altitude and speed, descending at about the same angle as when dropping to the landing beams. Down through the heavy banks of clouds it came, until, with a rocking motion, it settled to a stop on the surface of the ocean.

CHAPTER III
A Polite Visitor

WALLACE was indignant. He—one of the highest officials of the International Air Lines—robbed on one of his own liners. He vividly imagined the laugh the newspapers would have at his expense. His thoughts were interrupted by the roar of the wireless announcer built in the ceiling:

"Just be patient, gentlemen, and I will soon be with you. I will also acquaint you with the fact that resistance will only mean your death, for I am protected."

A side glance at his watch showed that the ray was on. He heard the air being released as the doors of the lower deck were opened, and a moment later the small elevator was rising to the upper floor.

"We may as well give in," thought Frank, as the elevator door opened a moment later and a well-dressed intelligent-looking man of about thirty stepped into view. "We'd better give the man the papers and let him be gone. It won't pay to resist."

Riel's face was a mystery. It was as expressionless as it could be; but as the man advanced down the aisle, his expression changed and showed more interest in events.

"Well, gentlemen, I hope you will not keep me waiting for the papers, but to save you the trouble I will help myself."

He lifted the cushions of the two chairs and a baffled look stole over his face, but he quickly recovered his former expression and turning toward the Englishman, and with all the ease and politeness of a host, remarked:

"I trust you will speed my departure by assisting me in the search for the papers."

"I'll get them for you," the detective replied, and walking over to the hiding place, drew the papers out. Wallace, meanwhile, was searching the brief case in a vain attempt to comply with the request of the caller.

"I thank you gentlemen for your assistance," the gay caller addressed them, as he put the papers in his pocket and stepped onto the elevator. "Perhaps I will call again in the near future and stay longer."

The two men remained standing, gazing at the spot where the elevator had disappeared. They heard him cross the lower deck, and Riel, suddenly returned to action, looked out of the window and saw a small white plane below close to the baggage room door. A moment later it was cutting across the water and, rising swiftly, soon disappeared among the clouds.

"Well?" Riel regarded his friend with a quiet smile. "We gave them the papers, but the raid was of more benefit to us than to them."

"But what is his purpose? Because he hears of us bringing some papers over he grabs them."

"This is something I cannot tell you until we get to London, but now we'll go down to the operating room and talk with the pilot."

"Well our bandit will have a warm time of it this time," Wallace commented as they shot down to the

lower deck. "Not only were there a dozen police planes in the neighborhood when we came down, but the pilot would send out the call on the radio alarm as soon as he started to come down."

"Your pilot didn't use the radio alarm," was the sleuth's quiet reply. "You will discover that when we get to the operating room."

As they crossed the lower deck toward the front of the craft, they could feel the huge cruiser begin to move forward with rapidly increasing speed, until it was tearing through the water at a fast rate and a moment later was in the air again.

In the operating room they found everything normal, and the pilot on the job.

"Did you use the radio alarm?" demanded Wallace as he opened the door leading into the control room.

"Let me handle this," cut in the Scotland Yard representative before the embarrassed pilot could answer. Turning to the pilot he asked, "Now, young man, why did you bring down the liner?"

Wallace was amazed at the question, but said nothing.

"Well you are right when you say I brought her down, for I did. The automatic radio control was not working right, and I intended to try and adjust it. But now, when I recollect, it was a foolish thing to do because I could have finished the trip with the manual controls."

"And have you fixed the control?"

"I just tested it out and I find that it is now working all right."

"It looks funny," fumed Wallace, "that you have to bring the ship down just at the time the robbers arrived."

"It isn't his fault although he thinks it is," Riel quietly informed him. "I must remind you once more that we are dealing with a very clever foe. Meanwhile we can return to the upper deck."

Turning to the operator he added: "If you get any calls asking why we descended, just say that we were making tests, and deny any statement that the raiders have been here."

A Deadly Weapon

"WELL I found out what I wanted to," Riel said as he dropped into his chair a few moments later. "Our clever friend is the most powerful man in the world. He has us all at his mercy and no doubt he is a maniac and will sooner or later turn our earth into a living hell just to demonstrate his power over his fellow-man. I tell you, Wallace, we've got to act quickly, quietly and surely while he is content to play with small things like this line of yours. One thing we know is that the wizard doesn't know of our wrist watch indicators yet. We have one chance in a thousand of keeping them secret, for he already knows that his ray is traceable. The radio instruments of a plane are affected when the machine passes through it, and the reception of radio messages is disturbed by the ray's magnetic action."

"Then you know where the beam is coming from."

"We have a very good idea of its location, yes. But the exact spot is not known."

"Then why don't you trace it down with your planes, if it's so easy to follow?"

"That has been tried, yes, tried too often before we discovered the power the man held over the rest of the world."

"You mean that the ray contains some deadly element that is fatal to anyone passing through it?"

"No, the vision ray is harmless in itself, otherwise you and I would be dead, for we have had it on us more than once. We are able to follow the ray; but few that have tried it have lived to tell of their experiences. The first attempt was made by your own government, who thought someone was illegally using a radio beam for wireless signals. A plane was sent out to trace the ray down, and it has not been heard from since."

"Probably shot down by the raiders when they saw the plane."

"No, Wallace, it wasn't shot down. A deadlier weapon was used on the plane before it got within a hundred miles of the wizard's base. The next attempt to trace the vision ray was made by the New York Detective Bureau after the robberies of your liners started. You remember where the wreck of their police plane was found next day."

"But there must be an explanation; those ships wouldn't fall down without a reason, surely the wizard can't do all this with hundreds of miles between him and his foes."

"A little later," continued the detective, "the ray began to be coupled with the raids on your air cruisers, but it was kept a close secret by the police. Scotland Yard sent two swift well-armed planes to search for the ray. They picked it up at noon the next day and followed it southwest. They never returned. The two machines suddenly turned on each other and fought a deadly gun duel to the death. One went down in flames and the other flew a few miles south and suddenly without warning swooped downward, diving straight down into the ocean with engines roaring at full speed. Another time an unofficial adventurer was seen following the ray by one of our planes. He was cruising along, not over one hundred miles an hour when to the horror of the observing plane he leaped from his ship into the ocean below, followed closely by his uncontrolled plane. Orders have been given to all ocean police to allow no one to follow the beam when it comes on the air."

"Then the ray must drive its victims mad."

"The vision ray itself is harmless, but something else is being used with it, possibly another ray. Now we'll drop the subject until we reach London, then we will try and find a way to deal with the situation"

In spite of the fact that he would have liked to learn more about the case, Wallace decided that it was best to remain quiet and wait.

Riel Gives Some Orders

DARKNESS was settling over the land when they left the transatlantic beam and coasted gently down into the area of the landing beam. And it was but a few minutes more before the cruiser came to a smooth stop in the London station.

"Well, here we are," Riel remarked, rising from his seat. "Now we'll probably be trailed by the ray, so be careful what you say."

Leaving the ship they stood on the platform a moment and watched the special leave. There were perhaps a dozen persons standing around, most of them waiting for the Paris liner.

"We'll go up to the offices and have a talk with your London manager," the detective said as they passed through the waiting room. "I called him from New York, so he will be waiting for us. Then we will go out to my place."

A speedy elevator soon brought the two men down

to the subterranean railway entrance and while they waited for a train, Riel glanced around at the crowd as was his custom, taking no special look at any one, but noticing a surprising number of things in each casual glance. There was a large crowd on the platform, for it was the evening rush hour, when the city's factories and skyscrapers were pouring their thousands into the streets. A workman in overalls with a dinner bucket in his hand, stood behind the pair. He received a second glance from the detective, but whether it was because he was standing in a place that looked suspicious, or whether the sleuth was just checking up to see if he was following them was hard to say. A woman standing near them also received a brief unnoticed look from Riel. He was apparently taking no chances of being followed. A train pulled in and the mass of humanity started toward the entrance. Managing to squeeze into the train, the two men were obliged to stand in the aisle. The man with the dinner bucket was near them, but Riel paid little attention to him; he apparently had satisfied himself with the second glance on the platform.

"Is this the kind of transportation you use in your travels about the city?" Wallace asked, nodding to the car packed tight with its human cargo.

"No, not as a rule," was the answer. "I must apologize for bringing you on this crowded car, but I did it to prevent being followed. We can lose a spotter easier in a crowd than by using street or air taxis which can be followed easily. I can't afford to have anyone follow us to-night, for I am taking you to where I have the plans that our criminal wizard is after, and I can not take a chance on being trailed there. Those papers are important."

Leaving the subway after a twenty-minute ride, the men walked along the lower street level to the Empire Building, taking an elevator to the forty-seventh floor where the offices of the London I. A. L. branch was located.

"It is best that I do the talking," Riel warned his companion as they entered the manager's office. "I will explain later."

The detective needed no introduction to Edward Graham, manager of the London offices, for he had had interviews with the official before, during his work on the present case. So, with little more than a nod to the man at the desk, he at once approached the subject of interest.

"I want to take a special liner back to New York to-morrow at ten in the morning. I will put on a disguise and slip onto the liner in the sheds, and take my place in the control room as an electrical tester. If you can put some new equipment on the control panels of the special, it will look more natural."

"I think I can arrange it all right, providing Mr. Wallace offers no objection."

"No objection whatever, Mr. Graham. You are to assist Mr. Riel in every possible way."

"Well, then," replied the manager, turning to the sleuth, "will you be carrying any baggage?"

"I wish to get a package of valuable papers to New York, and we'll have it secreted onto the liner in the sheds. It is not likely we'll be stopped this trip, for they got false plans from us before; and they'll think this trip is also a bluff. Even if they do learn of the shipment through spies watching the special, they will only see two men in the control room making a test flight."

"All right Mr. Riel," replied the London I. A. L. official, "I'll have the ship ready on time. I suppose you will attend to putting your package on board?"

"Yes," replied the detective, preparing to leave, "I'll attend to that."

Leaving the office, the two ascended to the roof and, signalling for an air taxi, were soon traveling to the west.

"Everything worked like a charm," Riel exclaimed with satisfaction looking at his watch for signs of the ray. "Just as I expected, the ray was on us all the time we were in the office, and our master criminal will play into my hands this time. But we had better maintain silence until we are more secure from the wizard, a single word may spoil all."

It was with difficulty that Wallace could keep quiet, for he was bursting with curiosity. A score of questions were burning in his brain. Why was Riel going to return to America? Did he really hope to get across with some valuables to see if it could be done? No, there must be more to it than that. No doubt he had made up that talk because the ray was on them, and intended to make a far different move. But if he was intending to make the trip, why would he tempt the criminals to another robbery? Could he learn anything by it? Was the package going to contain anything of real value or would it be another fake set of papers? Could the ray penetrate the package to see what was in it and so possibly beat Riel at his own trick?

Over London

SUCH thoughts ran through the American's brain as the taxiplane continued west along the city landing level. But he could see plainly that his companion did not care to discuss the subject, so he gave it up, deciding to wait until they had a chance to talk.

The progress of the taxi was slow along the landing lane, for planes were continually coming up or going down to landing places below. Building roofs, garage roofs, individual landings and the many municipal parking spaces, all added their share of craft to the crowded lower lane. But it was not long before the chauffeur reached an ascent cross-lane, which was commonly called the "A" lane. The "A" lane signal, which was a huge green and white revolving light mounted on a steel tower, was visible for a long distance from the air. The "D" lane or descent cross-lane signals were similar to the others, only that a red and white light was used

The taxiplane arriving over the "A" lane signal, ascended to its proper level, passing above the second lane which was assigned to heavy duty craft. Reaching Lane 3 which was composed of local light traffic it again resumed its flight to the west. Once on the third lane, the plane speeded up and cut through the air at a fast rate.

The heavy traffic of Lane 2 swept past below in a continuous stream, momentarily blotting out partial views of the illuminated city below. As far as the eye could detect the land was a continuous stretch of lights. Millions of them of all imaginable sizes and colors. The extra bright strips, stretching for miles across the black background, indicated the main streets. The revolving cross-lane signals could be seen scattered at intervals over the city—the traffic signals of the air traveler. The lanes below appeared as an endless stream of red lights, as the heavy traffic of the lower lanes swept past, the red lights on the upper side of the wings standing out bright and clear against the

darker background of the plane. It was a remarkable contrast to the view of the through lane above, showing only the green lights of the lower sides of the wings. The sky was cloudless but no moon was visible to flood with its light the landscape. But a plain view of the land below was not essential to safe air travel, for the altitude indicators told the flier what lane he was in, while the aerial traffic signals which were to be seen everywhere made it easy to find one's position. The direction signs located near the "A" and "D" lane signals, were plainly visible from the highest traffic lane by day, and well illuminated by night.

As the taxiplane continued to the west, the sea of lights in the city below gradually thinned out, and soon they were over the suburbs.

"Better drop down to the landing level at the next 'D' lane," Riel informed the driver through the taxiphone.

The "D" lane signal was not far ahead, and they were soon down on the landing level again. Here in the suburbs the traffic in the lower lane was not at all congested, and the taxi proceeded along at a good pace. They had not gone far along the lower lane when the detective again used the taxiphone.

"A half mile to the northeast; three white, four green and red in the square, south entrance," he directed the chauffeur.

The plane was slowed down as it approached the sleuth's landing place which could be seen plainly as they approached. Three white lights formed a small triangle, surrounded by a square of four green lights. This was the exact center of the landing space, and the four red lights marked the four corners of the area. Approaching from the south the plane slipped to the ground between the first two red lights and stopped just beyond the center lights.

"You have a nice location," Wallace remarked, stepping from the plane and looking the place over. "That is, what I can make out in the dark looks favorable. What is the long building to the west of the house?"

"That is my garage," the host explained. "I keep two cars and a plane and have a reserve space for one of each. I have barely enough ground to provide myself with air landing privileges. It's fortunate that planes can descend slower and stop quicker than they used to, or I'd need a ten-acre tract for my landing. But even at that everyone cannot afford an individual landing. Most of my neighbors use community fields. A group of neighbors maintain one landing field and air shed, which serves them all. It's a very economical way and quite efficient too."

The conversation was here interrupted by the approach of a policeman from the shadows of the house.

"Any orders, sir?" he asked, addressing the detective.

"Yes, Lester, I have a little job that you will have to do carefully," Riel instructed the man, with a side glance at the wrist indicator. "I am expecting a visitor soon, and I want you to be sure to get him for it is important that he doesn't get away. Is Simpson on the job?"

"Yes sir, he's on the other side of the house."

"Very good, then both of you keep in the shadows until you spot him."

With this the detective approached the illuminated entrance to the house. Pausing at the door he turned around to the police officer:

"And it's equally important that the ray doesn't catch you in the act, understand Lester?"

"Yes sir, the job will be done quickly."

"Since I've been on this case," the Englishman explained to his companion as they entered the hall, "I've had my house under constant guard with two men on each shift, for I can't be too careful when dealing with a clever crook as our master criminal undoubtedly is."

Entering a large room off the hall, he invited Wallace in, explaining, "This is my combination room; part library, part laboratory and the rest designed for comfort."

CHAPTER IV

Riel's Story

THE room indeed was a combination room, the American thought, as he looked about. The thick carpets and easy chairs with their well-stocked smoking stands, gave an air of comfort to the room. Along the wall opposite, from the hall entrance, stood a well-filled book-case, and to the left at the far end of the room was a mass of electrical equipment, neatly mounted on mahogany-colored panels, forming a switchboard about six feet high and eight feet long.

"My mechanical assistant," smiled the host, noticing his guest's interest in the apparatus. "Such equipment is necessary to fight modern crime. The scientific criminal employs all possible scientific methods to accomplish his work; and to fight them, the law must be equipped with suitable weapons. My secret radio equipment is mounted on that board and also my ray deflector."

"Then you have a device that will deflect the vision ray?"

"This house is surrounded by a strong magnetic field, which deflects the vision ray and prevents it from penetrating the walls of the house. Also the voice wave detector is rendered useless, for the voice pulsations, when picked up, are carried on the vision beam in some manner, so inside the house we are free to talk and move without fear of detection. I have a ray detector outside the house at a safe distance from the magnetic field, similar to the wrist watch indicator. It consists of two large coils of wire with a sensitive magnetic needle balanced between them. When the ray energizes the coils and swings the needle out of position, a meter on my board registers it and a red light at the top of the center panel lights up. This is arranged so that I will know when he has the ray on my house. There have been many attempts to see through my walls with the ray for I have papers that the man is after."

Opening a wall safe, Riel drew out a bundle of papers.

"Here is the only existing set of plans of the Skubic Light Wave Receiver, the papers that I am sure the criminal is after. This device is said to record the oscillations of light waves, and pulsations of a certain nature contained in these waves can at times be detected on the chart or recording strip. A study of these markings seems to have proven beyond a doubt that some one of intelligence must have produced them and that they were not just freaks of nature. A German produced the invention in America and wanted to return to Europe with drawings of it. But fearing that an attempt might be made to rob him, he asked Scotland Yard for protection and I was sent over. I was working on your case, at the time, trying to determine how your liners were brought down. I had, by then, discovered that a vision ray was being used, and had built my protecting field around the house, also

using the compass attachment on my wrist watch.

"Secretly I called on him, carefully disguised, fearing the criminal might be after the plans himself and would be watching the inventor closely with the ray. In that I was right, for I detected the ray every few minutes while I was there. Taking advantage of a moment when the ray was off I slipped his plans into my brief case and substituted some others in their place. Then, instructing him to take the air liner to London the next morning, I left him, and, again changing makeup, left New York the same evening on your eight-thirty cruiser. You know the rest, how the police plane that was escorting one of your cruisers was coaxed away from the ship which was brought down, and only the papers of the inventor were taken."

"Then why did he jump to his death during the trip, if he knew that the stolen papers were worthless, and that you still had his genuine ones safe?"

"He didn't jump to his death," Riel replied quietly, "he was murdered."

"What!" The eyes of the air line official opened with amazement; "Why man, there were at least a dozen passengers that witnessed the act. He deliberately swung his window down and jumped out."

"Listen, Wallace, I've told you before that I am sure that a power is being used that is many times as deadly as the vision ray and the voice wave detector combined. It is this power that brings down your liners, the reason why no police are ever on the job when a robbery occurs, the same reason why the police escort planes leave your cruisers just before they are brought down. And it was due to this deadly power that the inventor was made to leap from the ship into the ocean below. He was murdered by the wizard, who thinking that he had the only copy of the plans, caused the man's death to prevent him from drawing a duplicate set. With the death of the inventor, the criminal would be in possession of the only set of the plans on earth. But there the man made his first mistake for the papers that he got were worthless, and the inventor being dead, there was only one thing that he could do, and that was to obtain the only set that was in existence. Just how he discovered that I was in possession of them, I don't know. But knowing that I was tracking him down, it is quite natural that he would suspect me.

"The theft of the vision ray apparatus, some time ago in Paris, the invention of a young Frenchman, was undoubtedly the work of this man. Probably the possession of that was the start of his mad career, and he has improved the ray and used it along with some of his own inventions, such as the sound wave detector, to serve him in his lust for power. With it, he has probably been able to learn many of the world's secrets, for there is little that is closed to him. The vision ray inventor, however, was able to make a duplicate model of his device which is used universally to-day, but as you know, it only has a range of about fifty miles. So you see the stolen one must have been greatly improved. The one our criminal uses has a range of two thousand miles."

Riel Explains

"BUT why does he value this light wave receiver so high? Of what use would it be to him?"

"It is believed that the signals detected by this device are coming from another planet, and undoubtedly he believes that possibly he could learn many important secrets with it, once he learned to decipher the messages. It would be dangerous to allow the plans to fall into his hands, for if his clever brain ever did unravel the messages that the device received, the knowledge that he might learn would be of great assistance to him in his attempt to become ruler of the earth, which I believe is his sole aim.

"But to get back to the subject of importance, Wallace, I will need your help to-morrow in making a test."

"I'll do anything I can," was the ready reply.

"Well, then, in the morning we will both put on disguises. I must hide my identity in the future, to hide myself from the ray so I can work in secret. Now you are the one that will return to New York on the special in place of me. I will tip off the Yards that it is I, however. This is to be positive that no one knows that I remain here. You are of my build and will pass for me in disguise. I will give you my identification disc, for some of our men will be at the sheds to see that no one else gets aboard. When you get to New York you are to take the papers that you will find in the control room of the cruiser and place them in a safety vault so that they are safe. Then keep out of sight for a day or so and keep away from your old haunts. Then when you are sure that the ray isn't following you, return here under a different makeup. However, do not come up to this house unless you are sure that the ray is not watching you or the house. Your return must be made secretly.

"What I want the wizard to do is to try and take the papers that you will be carrying. I am sending in the package a complete set of drawings of the Light Wave Receiver with the exception of a chemical formula that the drawings are useless without. Some of the sheets of the drawings will be laid out on the desk of my assistant at headquarters while the ray is on, so that the wizard can see for himself that they are the real ones. He will no doubt keep track of them, until they are placed in the control room of the cruiser or given to you, and he will most likely try to bring the cruiser down to get the papers.

"Now here is where you come in. You are to see that he *does not* bring you down, that's your job, Wallace, and unless I am wrong you have a big job on your hands. You will ride in the control room beside the pilot, who will obey your slightest order no matter what it is. The reason that you are riding as a switchboard tester is so that you will be close to the operator all the way over, and can prevent any attempt by him to bring the liner down. When you step on board at the sheds, make up your mind that you will not allow the ship to leave the upper beam from the time you start until you arrive over New York. If, in spite of all you can do, the ship is brought down and the plans are taken away from you, we will gain more than we lose, for I will have learned something of great importance and he will have gained little."

"You can depend my doing my best, Riel," replied Wallace. "But, by the way, who was the visitor you referred to when talking to your police officer?"

"We were trailed on the train by a man in working clothes carrying a lunch bucket. My suspicions were aroused when I noticed during our wait for the train, that he handled the lunch box as if it was unnaturally heavy. The suspicions were confirmed when I purposely brushed against it in the crowd and felt the weight of it. Later he was near us on the car, reading a paper, and all the way out to where we got off the train, I noticed that he gazed at the same corner of the

It was a large spacious room, equipped with all kinds of scientific apparatus. At the base of the center panel, a man was kneeling. His hair was white and long, and a black skull-cap covered the top of his head.

page, which was not likely of a man interested in reading. So I purposely talked of the drawings here that I was going to show you, expecting that he would hear us and follow us here. As an agent of the wizard, he would, no doubt, try to find the location of the papers, the one thing the ray hasn't yet been able to do. Upon our arrival at the office, I found that the ray was on us, and I planned the talk of shipping some valuable papers across the ocean, knowing that he would suspect me of trying to secret the coveted plans across and hide them in America. When we left in the plane, I was glad to see that the ray was not following us. The wizard had undoubtedly thought that there was little that we would do but plan the trip for to-morrow, so he let us go, probably fearing possible detection of his headquarters by too much use of his ray. The agent, though, will probably make an attempt to learn something of the papers and follow us here. If he does my men will get him. I want to get him out of the way so I'll be free to act in the next few days."

"Now I'll call my assistant at the central office, so he can have his part of the job ready," the detective added going, over to a desk in front of the control board.

"Is there no danger of your message being overheard?" Wallace asked.

"Not in the least, for first my wireless system breaks the message into pieces sending it out on three different waves. I have a disk that is rotated by a motor mounted on the rear of the control board. This disk, during one rotation, makes contact with three different circuits each radiating waves of a different frequency. Now the message pulsations pass through the disk and are cut up, and only every third pulsation is thrown onto any one circuit. Then it is easy to regulate the speed of the disk so that it will break up the message sufficiently to be unintelligible when received on any one wave. Also, to make the message extra safe, I sometimes use coded words which my assistant and I have arranged. Further, we keep the combination settings of the two sets a secret, for, you know, he must set the receiving instrument at the same wave-lengths as mine and must also set the speed of his reassembling disk motor to correspond with the speed of mine to assemble the messages correctly."

Final Instructions

SEATING himself at the desk the sleuth lifted his phone and pressed a button. A moment later, a small white light lit up on one of the panels and Riel spoke into the transmitter:

"I am returning to New York on a special I. A. L. at ten in the morning in disguise, and I want you to let the ray see some of the sheets of that duplicate set of L. W. plans. Be sure and have them on board the cruiser when I arrive. I will ride in the control room with the operator who must be instructed to obey my every order during the trip regardless of what it is. I will speak to no one at the sheds but will have my disc for identification. The ray will no doubt be on you in the morning as usual to look over the papers on your desk and mine."

As he shut off his wireless instrument, two police officers entered the room with a man in custody. Wallace recognized the prisoner as the man that he had seen on the train, the man that Riel had said was an agent of the wizard. One of the officers carried the lunch bucket in one hand.

"Good work," congratulated the sleuth. "Just take him below for the time being but leave the tin bucket here."

Placing the lunch container on the table, the two officers left the room with their prisoner.

"I am glad that we have him out of our way," Riel remarked as he walked over to the table, "for I believe he is the only agent in London. Now we'll see what is in the bucket."

Carefully he opened the lid, and at the sight of the contents both men drew closer to it. The box contained a sort of radio device neatly packed in place.

"That is what I expected," Riel mused as he examined the outfit. "But how—oh! here we are, two wires come up to the handle and connect to a vibrator bar under the handle. You see Wallace," he continued turning to his guest, "how he was able to overhear conversation that was too low for his ears to detect. This device detects the sound waves, changes them to electrical pulsations, amplifies them up and through the wires to the handle over the vibrator bar. By holdings his fingers against the bar, our eavesdropper received the vibrations which affected his senses as well as sound waves striking his ear drums. No doubt when we take time to examine this device, we will find that it contains a means for adjustment to different frequencies of sound waves, so that the conversation of one person can be picked out from among a crowd."

"I would suggest questioning the prisoner," Wallace replied. "We can probably get some important information from him."

"He probably knows nothing," Riel answered. "I expect he is under the influence of the master criminal, and probably does not know that the wizard even exists."

"Then if our clever foe can press any one into his service, he will soon have another man on the job to take the place of this one."

"He will when he is sure that we have his man. But I intend to give our wizard other things to attract his attention to-morrow; and he will likely be too busy to pay much attention to the man. But I think that we should have some lunch and get some sleep for we have work to do in the morning, and you especially must be fully rested to do your part well."

CHAPTER V

Against Their Will

AT about ten-thirty the next morning, Wallace, disguised as Riel, entered the air sheds of the I. A. L., and showing the doorkeeper his identification disc, was quickly escorted to the special. The pilot was at his post all ready to start.

"We'll leave immediately," Wallace instructed the operator, as soon as he saw that the package was on board, "and you will not need to pass through the London station. Just use your manual controls until you reach the upper beam."

The motors were soon humming with a smooth musical note, and as the huge doors of the sheds rolled open, the special started forward and was soon speeding down the field. Wallace was climbing into a suit of overalls as the liner took the air. The pilot drew in the landing gear, and, having nothing more to do, sat down beside the operator. The steady climb soon brought them to the upper beam, and as the cruiser righted herself, the battery of motors began to hurl her forward with increasing speed. The sky was

cloudy over the British coast, and at times nothing could be seen but heavy banks of clouds. But the craft kept to the beam and was allowed to continue its terrific speed, tearing blindly along through rolling banks of fog.

"There may be a chance of getting through this trip if the fog sticks with us until we get a good start," Wallace remarked.

"I doubt it sir," replied the operator. "I've been forced down twice and there's something uncanny about it. When they want the ship to drop, it drops; and, somehow or other, a fellow can't prevent it."

"I'm positive," said Wallace, "that they are using a cross-beam similar to our landing cross-beam. This would start the ship downward, but at any rate we will make damn sure that no one brings us down this trip, for if our automatic controls fail us we will use the manual levers."

As they sped along, the atmosphere cleared up for about a half hour, then they ran into an even foggier area, and the heavy rolling fog-banks were sent flying past the speeding craft on both sides.

"I should think we'd enjoy the trip better if we were to drop down a little out of this clouded area," suggested Wallace.

His pilot was evidently thinking the same thing, for he asked: "Shall we leave the beam and drop down a little?"

The official readily consented, and the pilot using the manual controls dropped down out of the beam. They had not traveled far before they were below the clouds with the sea far below in plain view; still the cruiser dropped, steadily losing altitude as it continued to the west. The two men had apparently forgot about the clouds, for they were allowing the craft to steadily drop without interruption. They were now only a thousand feet above the ocean but still they continued down, to every thousand feet that they traveled west they dropped a hundred, until the ship hit the crest of a wave; flew on, hit the water again and settled down onto the ocean like a monstrous sea gull.

The pilot half absent-mindedly stopped the ship, and turned to Wallace: "You are supposed to be posing as a control tester, Mr. Riel, so here is a good chance to find out what is the matter with the ship."

Wallace realized that he was on board for that purpose, and turning to the mass of controls on the different panels, decided that he might as well look them over and see what he could find out about them.

Neither of the two men noticed a third enter the room and stand looking at them with a quiet smile on his face. He was the same person that had taken the papers from Riel on the former trip.

Suddenly Wallace's head cleared and he took in the situation. He could not recollect how the ship had been brought down, or why he should find himself crawling among the wiring behind the control panels. But things were now clear to him, and he watched the calm figure of the intruder, waiting to see what his next move would be. The pilot was none the less puzzled, and he vainly tried to grasp the situation. Here he was again floating on the surface of the sea, after he had made up his mind that he was going to get through on this trip at all costs.

"Well Riel," the bandit addressed Wallace, "you will come along with me, the boss wants to ask you a few questions and it will be useless for you to resist, because you can do nothing."

"I'm not Riel, I'm—"

"We know who you are. The boss knows more about your business than you do, so come along."

There was nothing else to do so, instructing the pilot to return to London, he walked out of the control room with the bandit following. Entering the baggage room, he detected, through the left door, which was open, the little white plane which had so successfully eluded all police planes. In the cabin, he was forced to swallow a small tablet which the captor handed him, and in a few minutes was lost in sleep.

Meeting the Wizard

WHEN Wallace opened his eyes, he was lying on a bed in a small room. Rising to a sitting position he pondered over the situation. His brain was slow in clearing up, due to the effects of the sleeping tablet, but it was not long before he remembered everything. He had been kidnapped as Riel. Apparently the criminal leader desired to get the sleuth into his power, and hearing the talk in the offices of the I. A. L. had stopped the liner to get Riel, and had got him instead. Wallace, seeing that his disguise was not disturbed, walked quietly to the door, opening it softly.

The door opened up into the side and near the end of a large room. It was a long spacious room, fully equipped with all types of scientific apparatus. Along the wall opposite to his door ran a bench about two-thirds of the room in length or approximately twenty-five feet long. This was fully equipped with a complete outlay of chemical experimental and testing equipment. The rest of the room was filled with the greatest display of electrical equipment that he had ever laid eyes on. Stepping into the room he found that along the wall, near which he was standing, was a second bench running about the same distance down the room as the other. This was constructed of grey slate, and covered with all sorts of electrical instruments and parts, wires and partly-assembled devices, many of which he had never seen before. Much of the material was connected by loose wiring—probably for testing. Above the bench mounted on the wall were a row of marble panels extending the length of the bench, and fastened so that any one panel could be taken down with little trouble. The different panels were electrically connected together by a type of spring switch that could be disconnected by a mere touch of the hand. The mass of equipment on these panels was too complicated and too unfamiliar for him to even make a guess as to their use. At the far end of the room, about six feet beyond the end of the work benches, was a massive instrument-board reaching from the floor to about eight feet in height and about two-thirds the room in width or approximately twenty feet. Every panel on the board was literally covered with dials, meters, coils and other controls. In the center of the room was a long table with chairs around it. Many instruments, push-buttons, meters and such were sunk into the polished top of the table, leaving the surface unobstructed. And in front of each chair around the table were squares of frosted glass about six inches square and supported vertically by an adjustable bracket, so that it could be tilted into different positions similar to a mirror on a dresser. Frank judged that the heavy ornamental table legs must be hollow and carried all the wiring from the table controls and instruments, for he could see no other outlet. In fact, if he was not somewhat familiar with such work, he would have doubted that there were any

wires around the table, for not an inch of wiring could be seen.

Then Riel was right, he thought, this must be the work room of a clever scientist, who was using this electrical equipment to control the world with. A sound from the direction of the switchboard attracted his attention, and looking in that direction he noticed, for the first time, a man kneeling at the base of the center panel. His hair was white and long, but his slightly wrinkled face was clean shaven. His bent shoulders indicated that the work of continually bending over instruments and drawings was beginning to tell on him. A small black skull-cap covered the top of his head and a cord running down from it was connected to the panel. He was apparently busy testing something out for he had not as yet noticed Wallace.

"This must be the wizard," thought Frank, as he silently watched his captor. "As far as I can see from a side view he doesn't seem to be the devil that I expected to meet, but you can't always tell a man by his looks."

His thoughts were interrupted by the other rising and removing his cap. "You are right," he spoke, turning and advancing toward his visitor with a quiet but baffling smile, "you can't tell a man by his looks. My advice is to make sure of him by testing him out."

Wallace's mouth opened in amazement as his host continued: "You seem surprised, Mr. Wallace, that I can read your thoughts. I, in turn, am surprised that a simple demonstration of mental telepathy should so astonish you."

"Mental telepathy? Such a thing is impossible. You no doubt knew what was on my mind by reading my face."

"Then you don't believe it is possible to read another man's thoughts."

"Of course not. It has been tried often, but has never been done and never will. Such a thing is impossible."

"In a few minutes I will endeavor to change your mind on the subject. But first allow me to introduce myself as J. B. Jolsen. You may as well make yourself comfortable, for your visit will likely be a long one. You may also take off your disguise, for I am sure that you will be more comfortable without it. It was very clever of Riel to substitute you in his place, and also very careless of me not to have noticed my mistake before I brought you here. But any way, I may find a use for you later on. But to return to the subject of mental telepathy. You are like the average man, you must see a thing done or else you brand it as impossible."

The Wizard's Power

THE wizard seemed to be in his favorite rôle when lecturing on science, and Frank was willing to hear him.

"I have worked a long time on the theory that the human brain radiates vibrations or waves which, by using a suitable system, could be detected."

"You mean you can turn a man's thoughts into speech," gasped Wallace.

"Exactly, and while working on a ray by which I could collect and carry the thought waves to my amplifying and transforming device, I accidentally found a way to improve the vision ray that I am now using, greatly increasing its range. Having developed the vision ray, I used it in my further experiments to produce the telepathy ray. And it is well that I did, for after producing a high frequency wave that would carry along the vision ray, I knew that I had discovered it."

His prisoner was silent, he could see the logic of the man's words. He knew now what Riel meant by another power. He recollected how it was used on them to reveal the hiding place of the papers during the robbery of the liner which he and Riel were taking to London, also the reason why he and the pilot had been so willing to bring the ship down on the last trip. The wizard was indeed entitled to the name of Master of the Earth.

"For two persons to exchange thoughts," his host continued, "it is necessary that their brains be of like character, for the human brain is similar to the wireless instruments. When one wireless set sends a message into space, the set that receives the message must be adjusted to a wave length; that is, the circuit that receives the message must be adjusted so that it will be most sensitive to the frequency of the waves that are carrying the message. The human brain works on the same principle in respect to telepathy. Two persons having brains whose characteristics are similar, will be more successful at mental telepathy than others. But mental telepathy will never be a success because the thought waves that a man tries to receive from another are so feeble that his own thoughts drown them out, and it is almost impossible to free the brain from one's own thoughts sufficiently to make it sensitive enough to receive the thought waves of another. So you can easily see that there is but one thing to do and that is to build up the thought waves until they are strong enough to be detected by the other brain. In fact, if you build them up strong enough and pass them through another man's head, they will take possession and control of his brain by being more powerful than his own thoughts."

"You mean that you can force one man to think the thoughts of another?"

"Exactly, I will prove it."

As he spoke, the wizard turned to the electrically equipped bench and commenced to adjust a number of controls on some of the panels mounted on the wall, while Wallace watched him wondering what was about to happen next.

But in a moment he forgot about the present, he thought about the events of the trip from London. He remembered the trip through the endless banks of clouds and he wondered if after all it wasn't better to leave the beam and travel below the clouds in such cases.

His thoughts were interrupted by the scientist saying: "Well, is that proof enough?"

"I wasn't noticing you," admitted the other, "I was thinking of—"

"You were thinking the same thoughts that occupied your mind before you brought the liner down yesterday. Or, I might say, the thoughts that I put into your head to make you bring it down, I used again, just now, to prove my power over the rest of mankind.

"I can read any man's thoughts and learn all his secrets. I can put his thoughts into another man's brain and not only cause one man to talk another's thoughts, but as the brain controls the body I can make him do what I wish: I can make him hate, love, steal, murder or whatever I wish him to do. By control of man's brain I am master of this planet. All men are my servants."

Frank was utterly dumbfounded. But gradually the

full horror of it came to him. To think that man was no longer master of his own brain, no longer able to say what he wanted, or remain quiet when he wanted to. He realized the havoc and madness the telepathy could create in the world. People were no longer free to think without this man knowing all about it. Human beings would live in a nightmare afraid to think for fear of others hearing them. Even in the secrecy of their own homes the world would know every thought flashed through their minds. He remembered how he had imagined the panic that the wizard's vision ray would cause if the public ever knew of its existence and use. But there was a protection against the vision ray, as Riel had proved. A person had merely to produce a magnetic field of sufficient strength to ward it off. One's home could then be screened off from it and one's secrets guarded.

Wallace closed his eyes and then more clearly realized the devilish effects of this thing. The vision ray would at least allow you to think in secret. But now even when one was thinking how was one to know whether the thoughts were one's own or those of some one else. How could one tell, when he talked, whether he was speaking thoughts of his own or those of some other person. It was madness. It was hellish. A person was far better off dead.

What the Wizard Revealed

AS these thoughts ran madly through Frank's brain, he had forgotten about the scientist who was standing near him with an amused smile on his face.

"And you intend to use these devilish instruments against mankind to satisfy your greed for power?" Wallace demanded finally.

"I will use it against any one who stands between me and my goal," was the cool reply. "I will, if necessary, turn one-half of the world against the other half in a war that will completely wreck your civilization."

"You can accomplish nothing by that, for your own existence is dependent upon civilization."

The scientist shook his head.

"During the excitement of war, it will be easy for me to obtain certain papers that your friend Riel has in his possession. In fact, when the world powers see that I am able to fulfill my threats, there will be no delay in getting the papers for me. I was about to send word to your detective friend telling him when to send me the drawings, when you entered. Now, if you will excuse me, I will carry out my task and, inasmuch as Riel uses a triple-circuit wireless in his office, we will send him a message through it. I built a duplicate of his set for this reason. I had little difficulty getting the plans from Dr. Forest who invented the system. First, we will put the vision ray on his office and see if anyone is there. We must read the dial setting of his instruments. Now if you will take a seat here at the table I will show you the power that I have in the vision ray alone."

Going over to the experimental work bench, he returned with two head-riggings and handed one to Wallace, showing him how to adjust it onto his head and plug the projecting cord into the table. The head gear consisted of a leather cap that fitted closely over the head and containing a sort of felt lining. A strap ran down each side of the face from this cap and fastened below the chin; ear units, covering the ears, were attached to the strap also. A close-fitting mouth unit and a black mask stretched across the eyes, having two pale blue, convex glasses to see through, were also attached to the side straps of the head gearing.

Wallace adjusted his mask and adjusted the square of glass on the table until he could see it best, though at best he could see little through the blue glasses.

"When you want to talk," the scientist's voice sounded in his ear units, "use your mouth attachment, and turn dial four in front of you. This gives me the signal and I can connect my head set with yours. For when we are not talking we must keep our ear units connected onto the voice wave amplifier to hear the sounds that our ray receives."

Wallace was mystified at the pleasant mood of his captor, but decided to accept the hospitality and learn all he could. Then, perhaps, a chance would come in which he could assist his friends on the outside to overpower the master criminal.

"This small wheel here," continued the wizard, through the phone circuits, and pointing to a control in front of him, "controls the ray pointer which is located on the roof. This meter, between our chairs, is divisioned off and marked similar to a compass. The thin black pointer which is pointing N.N.E. indicates the direction that the ray pointer is turned to. It is now pointing north by northeast which will pass the ray through London. Now watch your reflector plate and I will turn on the ray."

The scientist turned, twisted and turned a number of table controls and presently there was a scraping sound in the phones, the glass plate lit up in a momentary flash and was dark again. Then, again, it fluttered and this time remained dimly illuminated. The upper part of the glass seemed to reflect the light a little brighter than the lower half. But, again, the light shifted and the blur began to fade, while the sound of rushing wind could be heard in the ear units. Gradually the scene cleared and the upper or brighter half could be recognized as the sky and the lower part as water. With the clearing of the scene, the hearing device cleared up too, and the sound of the wind and the occasional breaking of a wave could be heard plainly. Under the guidance of the master's fingers, the scene swept past the little reflector plate at a fast rate, until the outline of the British coast could be seen followed quickly by the waterfront of London. Soon, towering buildings of the city were filling the scene. A moment later a single building had been singled out by the nimble fingers of the wizard and was quickly brought to a close-up.

A Test of Power

CLOSER and closer the building approached, and the noises of the city increased steadily. Now the scene had focussed on the building itself until only one small section of the wall was filling the scene. It was so close that the bricks could be counted with little difficulty. Another change began to take place and the bricks of the wall gradually faded as another scene took its place. As it cleared, Wallace gave a start; it was the office of Graham, the London manager of the I. A. L.

Graham was talking to a man that Wallace had not seen before.

"But if Riel was the only one that went on the liner, then where is Mr. Wallace," Graham's voice sounded in their ear units. "He was last seen in company with the detective."

"There is no need to worry about Mr. Wallace," assured the stranger. "He is undoubtedly safe, but

is remaining in hiding for some reason. You know that only Riel was on the liner at the time it was held up, so your friend is undoubtedly still in the city."

Suddenly the scene went dark and, looking over at his host, Wallace saw him removing his head-set and followed suit.

set and followed suit.

"That man is from the offices of Scotland Yard. I've had reasons to trail him on one or two occasions before. A very clever man but, in comparison with my brain and power, he is but a school boy. I, alone, of all human beings, am entitled to the word clever, as I shall presently prove. Once I have the plans of the Light Wave Receiver in my hands, I will be ruler of the earth. Your friend of the detective force shall bring them to me for I know that he has them."

"Why do you put so much value in the receiver? You may be unable to decipher the code, because the language is unknown to us."

"There you are mistaken again," his host corrected, "for the language is very similar to French, which I can read and speak very well."

"You are only guessing, for there is no way that we can find out the language."

"I have obtained a recorded strip of pulsations received by this device, and by changing the pulsations into electro-magnetic impulses, I amplified them. Then changing the amplified pulsations into sound waves through the voice producer, I recorded the sound and have it to study at my leisure."

"Then you have been able to read the message?"

"Yes, all but a few words which are somewhat confused. But it is not difficult to guess the meaning of them. Having transformed the message to French, I translated it then into English. So when I get the Light Wave Receiver, I will be able to connect up my system so that the message will be automatically received, changed to electrical impulses, amplified and recorded in French which is the language that is being used. By means of the device, I will learn many of the secrets of the super-intelligent planet that is sending the messages, for it is undoubtedly the work of another planet. Finally, by adding their knowledge to my own, I may not only be ruler of the earth, but the master of the solar system. Only the possession of the plans is needed for accomplishing my purpose. But I will get them, for what I want, I have the power to get. I will sit as ruler of the earth, while I prepare for my conquest of the solar system."

The eyes of the master mind shone with fierce light as he warmed up to his talk.

"We will now get the combination of Riel's Triple Wave Wireless Set, so that I can send him the message privately."

Noticing the surprised look on the face of his prisoner, the old man continued:

"You no doubt are wondering how I can read the dials of Riel's wireless set which is protected from my ray by a magnetic field."

"That *is* what I was wondering about."

"Then put your mask on again and I will show you how helpless your friend is against me. You will see how utterly useless it is for him to hold out, and especially to try to bring about my downfall."

The ray was soon on again and with little trouble Jolsen had focussed the scene on the headquarters of Scotland Yard. A moment later the scene was adjusted so that they were looking into a single room. The details of the room stood out quite plainly, with the exception of one corner that produced a sort of orange-colored glow. But whether it was the fault of the vision set or was caused by a bright lamp in the corner of the room, Wallace was unable to tell. There was no one in the room at the time, but the desk was littered with papers, indicating that someone had been there recently.

"Do you notice the glowing spot in the corner?" Jolsen asked through the phone circuit. Then, without waiting for a reply, continued, "That is where the Triple Wave Wireless Receiver is. That glow is caused by the magnetic field deflecting my ray. It is a good barrier at that distance, for I cannot produce sufficient pressure to break it down. But if that field was within two hundred miles of me, it would be useless, for I could break through it with ease. Riel's other protecting field also would be of no use to him at close range."

"Then your attempt to read the combination of the triple circuit receiver is useless?" Wallace said triumphantly.

Ignoring him, the old man shifted the ray again, and they were soon looking into the basement of the building, the switchboard that controlled the lights and power of the building appearing before their eyes. For a moment, the wizard surveyed the scene and again changed the ray, shifting it around the room until he brought it to rest in one corner where a workman sat reading a paper.

"This man is the maintenance electrician for the building," he informed his guest. "Now you are about to see how I give orders to the world and how quick and faithful it does my bidding."

A few more buttons and dials moved beneath the man's fingers. The man in the scene looked up from his paper and scratched his head in deep thought and finally deciding something he rose and approached the switchboard. Quickly Jolsen brought the board up close in the scene as the man stopped in front of the panels, and looked over the different breakers and trips. Again the fingers of Jolsen moved a dial and the next instant the man in the scene tripped the largest circuit-breaker on the board. Instantly the scene changed and that of the office was seen again, the glow in the corner was now gone and the cabinet of the wireless set could be seen on a table, and a device that Wallace judged was the recording device was resting on the receiver. Another moment and the wizard had a close view of the set, so close that the dials could be seen and the settings read with ease.

It was but a few seconds until the old man had copied the dial readings, and then suddenly the glow in the corner returned.

CHAPTER VI
A Message

AFTER shutting off the ray, Jolsen removed his mask and Wallace did likewise.

"You see I have the combination," remarked the wizard, with a smile, "and it was very little trouble."

"You used your telepathy ray?" asked Wallace.

"Yes, you see the power that is used to produce the field around the wireless set is taken from the lighting circuits, and to remove the field, all that I had to do was to turn off the power. That I did by putting thoughts into the brain of the electrician to that effect. Controlled by the thoughts that took possession of his mind, he went over to the board and tripped the main breaker, throwing the power off the whole build-

ing. This, of course, removed the power that was supplying the magnetic field, and the result was that there was no more field. Of course, as soon as I removed the ray from the man in the basement, he was in command of his own senses, and seeing the breaker was out, no doubt he thought that it tripped out on account of overload. So to prevent him from throwing it back in, I could have led him away from the place, or done a dozen other things with him to keep him away had I wished. But I did not want to leave the power off too long, for it would lead them to investigate. Riel, hearing of it, might get suspicious."

"Then you are going to send the message to his office?"

"No, to his home. The two sets will be adjusted to the same setting so I can send my message via his office set to his home."

"But you could have taken the reading of the set at his house as well as at his office," Wallace said, puzzled.

"No, the protecting field around his house is not supplied from the power lines like the one in the office. He has, no doubt, a small independent generating plant in the house, and as it is inside the field, I cannot find a way to throw the power."

"Then your telepathy ray is of no use outside of the vision beam?"

"No, when the vision beam is deflected, the telepathy ray is also deflected, for it is carried on the beam. Now I will get the circuit settings changed to correspond with those of Riel's set. You may stay here at the ray and use it, and if you would like to change the adjustment, use these two dials here. Oh, there is no chance of you learning too much," he added, noticing the puzzled look on the other's face. "I will see to that. If you did learn some of my most important secrets, I would have no cause for worry because it is impossible for you to escape from here. This place is located on an uncharted island."

With these words, he disconnected his mask from the table and took it over to the experimental bench. Wallace watched the wizard adjust some of the controls and automatic contactors on the wall panels. Then, donning the head set again, Frank pressed the vision ray contactor button. The reflector screen lighted up at the touch, and the office scene was again before his eyes. But now there was someone at the desk. He had no doubt but that the man was Riel's assistant, and wondered if he was aware that the ray was on him. A closer adjustment of the scene soon satisfied him, for the man wore a wrist watch, and Wallace noticed him look at it occasionally. Could he signal the man? The thought flashed through the official's brain. He knew the international wireless code. Perhaps by shutting off the ray and switching it on at long and short intervals, the detective would notice it. He would try Nervously his fingers pressed the ray button on and off as he spelled the word "Riel" twice, then switching on the ray, he watched the man closely. But the fellow did not seem to notice, for he continued writing at his desk and seemed absorbed in his work. A moment later, however, the man leaned back in his chair, and looking up spoke:

"All right, Wallace, wish we could help you but don't lose hope."

His heart beat faster as he heard the words, then the man had read the message, and knew that he was a prisoner. He felt greatly relieved that Riel would know that he was alive and in the laboratory of the wizard. He also realized that Riel would perhaps look for help from him in case they attempted to attack the place.

There was a tap on his shoulder, and Wallace removed his head set to see his host standing behind him.

"The detective didn't receive your signals by means of the wrist watch," the old man remarked, with an amused smile on his face. "He has a similar indicator on his desk that he can watch. But I shall have to see that you send no more signals, or keep you from using the ray."

"Isn't there anything I can do without you knowing it?" asked the disgusted prisoner.

"If there was, you might do me harm. As it is, you are harmless. I allowed you to send your message because you can do yourself little good, or me little harm. The world is in my power, and your feeble rebellious attempts will not help you any. In fact they might prove advantageous to me, for by reading your thoughts just now, I found that your friends were using a wrist watch as a ray indicator, a thing I did not know before. But I am ready to send them the message. Put your mask on again and you will hear it as it is being sent. We will also watch the set at the office to be sure that it records correctly."

A Threat Made Good

WITH masks adjusted, a few controls were moved in front of each of the men and a red dial carefully turned. A scraping sound in the ear pieces gave way to words:

"Detective Riel will place the drawings of the Skubic Light Wave Receiver on an air liner, which will leave London to-morrow morning at 9.30 for New York. If he fails to do this, I will create a reign of terror through England, that in horror, will be beyond imagination. By order of: The Planet's Air Master."

"The message is now recorded on his oscillograph," the wizard informed his captive.. "Now he is going to switch the announcer into circuit. Listen."

A moment later their head sets were connected with the sound wave panel of the vision ray apparatus, and the detective could be heard adjusting the dials, as he stepped to the set to see what message had come in. As he did, the announcer spoke out the message to him. The man stood before it a moment or two as if temporarily stunned, a deep look of worry came over his face, then slowly shutting off the set he returned to the desk.

A slight disturbance on one of the meters caused old Jolsen to leave the scene of the office and throw the ray around the sky, sweeping back and forth, and at the same time watching the meter. In a few moments he had the beam on a fleet of six planes that were approaching.

Wallace also saw them and his heart gave an extra beat as he realized that they were probably following the beam, in an endavor to trace it to its source. His hopes rose further as he recognized the slightly tapered wings of the Burley plane, used by the American police. The wizard was quietly watching them as he kept them in the ray.

"This is my opportunity to demonstrate to you my powers," he boasted through the phone circuits, as he began to adjust some more controls, and draw the scene closer. "I'll show you the powers of my telepathy ray, and at the same time illustrate what happens to those who meddle into my affairs."

He busied himself on a few more dials, while Frank

wondered what his game was, thinking that the wizard would lead them off the trail.

"Now the ray is on, watch the greatest demonstration of power ever seen on earth," the cool boastful voice sounded in his ears.

Frank needed no invitation to watch. He sat tensed watching to see the effects of this ray. Suddenly the fleet of planes broke formation and commenced circling one another in a strange and disorderly way.

"Looks like I'll have to strengthen the ray," the wizard was saying. "They have picked men with very strong will-power. But I'll break them with less than a kilowatt increase."

More adjustments were made with some of the many controls under his hands, as Frank glued his eyes to the scene. Then he gave a quick start and his face paled. The planes were now racing around each other at maximum speed. Then he heard the rat-tat-tat, the unmistakable sound of a machine gun that added its noise to the hum of the motors. There could be no doubt that they were shooting at something. Suddenly the truth of the situation came to him, and a chill of horror ran through his body. Under the power of the telepathy ray they were shooting each other down like mad men. Each one undoubtedly saw himself surrounded by a flock of savage beasts. The ray was filling their brains with a bestial rage, and each ship was pouring shells and gas streams into the rest at every opportunity.

The Terror

DRIVEN almost insane himself by the slaughter before his eyes, Frank savagely tore the rigging from his head. He would smash the ray control panels or die in the attempt. Seeing the other was still wearing his mask and watching the scene closely, Wallace glanced over at the main control switchboard, on which was mounted most of the control units of the telepathy ray. In one moment he could rip the mess of fine wires behind the panels and put the ray out of commission, thus saving the lives of the men who were now butchering each other. Quickly, but quietly, he rose from the chair. But the moment he left the cushions, he seemed seized with pain, and he sank back unable to move a limb. Suddenly as the cramp seized him, it left him again.

"I was expecting you to do something contrary to my wishes." The wizard had removed his head set and was regarding his companion with an amused expression on his face. "I adjusted the paralyzer ray on you. You set it off, when you attempted to leave your chair. But come, you are missing a fine scene." And donning the head apparatus again the scientist was soon gloating over the scene before him on the reflector plate. Wallace, realizing the uselessness of any further attempt to destroy the ray, put on his own head set again.

The scene that met his eyes was horrible. There were now only five ships in the air, and there were fighting each other in the most savage and desperate way possible, recklessly spraying streams of bullets around and about them and using the deadly gas guns at every opportunity. Suddenly one broke out in flames, but the two members of the crew stuck to their posts and the blazing craft tore through the group, firing left and right until it shot down like a flaming meteor, disappearing in a bank of steam as it struck the water. The scientist adjusted the controls until they were looking into the interior of one of the ships. The man at the gun was sending streams of shells at every chance, while the pilot with cruel set face, sent the ship careening around the battle area. The loud roar of the engines and guns at close range were ringing in their ears so loudly that old Jolsen had to reduce the sound with the volume regulator. One plane, taking a wide circle, left the center of battle and in a moment the wizard had the center of the ray on it. The gunman was looking around desperately for a plane to shoot at. Then, turning to his pilot, he paused a moment while rage and hate registered on his face. Then, with a savage oath, he sprang on the back of his companion. Fighting madly like beasts, under the influence of the damnable ray, the two men rolled, clawed, and scrambled among the controls, while the unguided craft sped to its doom. A few moments later, the tortured minds of the two men were calmed by death, as the sea closed over them.

Tearing the mask from his head again, Wallace leaned back in his chair, weak and pale.

"Good God," he stammered as the other turned to him, "if I ever get a chance to make you pay for this, you'll pay dear. You must have the soul of the devil, for no human could slaughter his fellow man like that."

The wizard merely smiled the same cool, maddening smile. "What you have seen is but an infinitesimal part of what is to come, if this world forces me to declare war on it."

Frank rose wearily from his chair. He was sick, mentally and physically. He had received all that he could stand for one day, he wanted to rest and forget the nightmare. Entering the little bed-room, he flung himself down on the bed in misery. But the mental strain was too much for him, and he soon fell into a deep sleep.

The World Obeys

THE sun was high in the sky when he awoke the following morning. For a moment, he wondered where he was. Then the events of the previous day returned to his mind. Remembering the threat of the wizard, he was anxious to see if the air cruiser would have the plans, and what the wizard would do if he failed to get them. He had slept all night in his clothes and wasted no time in stepping out into the laboratory.

"Good morning. I hope you had a good rest," was old man Jolsen's greeting from the table where he was going over some plans. Frank made no reply and the old man, pressing a button, continued his work. A door at the end of the room on Wallace's right opened and a butler appeared.

"Take care of any of this gentleman's needs," the wizard ordered.

"This way, sir," the butler politely requested him, leading the way out through the door.

Frank noticed that the bathroom windows were not barred or protected in any visible way, nor those in the small, luxuriously furnished dining room. But he had no idea of attempting to escape. He had no doubt but that the place was well protected, for he knew that a man like the wizard would take no unnecessary chances. He also realized that with such a calamity as the telepathy ray threatening the world, he would be of no use on the outside, while he might be able to accomplish something from within.

The breakfast that was served was an excellent meal. It was evident that the scientist had no trouble in

obtaining any of the world's delicacies when he needed them.

When he returned to the laboratory, the wizard was at the table using the vision ray, and Frank, not caring to miss anything, slipped into his chair and donned his head set, and the scene that met his eyes he quickly recognized as the air line station in London.

They had not long to wait until a westbound cruiser glided in, stopping to receive its load of passengers and baggage.

The wizard swept the three platforms and the interior of the liner with the ray, watching the people closely. But he seemed to detect nothing unusual, nothing to lead him to think that the detective organization was sending the plans out on that liner. He then tried the telepathy ray on some of the officials and the liner crew, but no thoughts could be read indicating any knowledge of the papers. Frank, connected to the transforming unit of the telepathy detector, could hear the thought message as well as his host. It appeared as if the police were intending to defy him.

Suddenly the wizard straightened up, a slight hum could be heard in the ear units. Tearing his head set rigging off, he leaped across to the automatic wireless recorder, and switched on the announcer. There was a scraping noise and, as it died down, a man's voice sounded clear and distinct in the instrument.

"Light Wave plans leaving on air cruiser 49 S. P."

That was all, the instrument became silent.

"You see they are beginning to realize the power I hold," exclaimed the master criminal, his eyes gleaming with greedy pleasure.

Returning to the vision ray apparatus, he swung the ray to the south, and soon had it adjusted on a heavily wooded island. Frank, gazing through his mask, was unable to determine the location of the island, but he noticed that the trees appeared to resemble those seen in the tropical regions. He therefore, decided that the island must be somewhere in the torrid zone.

As the scene was adjusted to appear closer, he detected a small snow-white plane, lying in the water close to the shore, partly sheltered by the wide-spreading foliage of the trees. He recognized the plane as the one that made the raid on the air cruiser during the trip to London with Riel, and also the same plane that had carried him from the air liner. He could see no sign of the pilot, however, nor anyone else in the island. But he was sure that the air man had a hut in the woods somewhere.

For a moment the scene remained in front of his eyes, then it was shut off, and he saw the scientist removing his head rigging.

"Just gave my man orders to look over the baggage room of your airship," he informed his prisoner, as the latter removed his head apparatus.

"I didn't hear you do any talking," replied Frank.

"I didn't talk, I just use my thoughts and put them on the beam. He receives his orders direct from brain to brain, as you noticed he was not even in sight, and I did not increase the pressure of the vision ray sufficiently to look through the trees. I merely threw the telepathy ray across the center of the isle where his cabin is, so I know that he will receive the message. Even if he is asleep the thoughts will impress themselves on his mind that he will awaken with a clear remembrance of the message."

Again he turned to the table, and they were soon following the ray as it was trained onto the air cruiser, which was now well out at sea, speeding along the upper air beam towards New York. The vision ray was soon adjusted so that the baggage room was exposed to the eyes of the two men, and with little difficulty, they found the package, a small wooden box a little over a foot square, plainly marked "Light Wave Receiver." There was no address on the box, in fact no other marking except the three words.

It had evidently been placed in the baggage room after the ray had been taken from the ship as it lay in the station, because the previous search of the baggage room revealed no sign of the box.

The wizard gave a chuckle of satisfaction which produced an uncanny sound in the ear units.

Wallace noticed that there were four men in the baggage room, instead of the usual two. The box was placed conspicuously as though they wanted to make sure it could be found. He suspected that Riel was at the bottom of the movement, and that they had a trap of some sort to spring on the raider, when he made his usual call. He wondered if the detective knew the full power of the telepathy ray, and if in some way he was going to overcome it. His thoughts were disturbed by the sudden shifting of the ray, as the scientist took a look to see if the plane was on the job. But the little white plane was already swiftly cutting through the clouds, occasionally fading from sight as its color blended with the white background, disappearing altogether as it dived into the white mantle.

CHAPTER VII

New Hope

THE old man was apparently satisfied with the progress of the plane, for he left it and swept the sky for signs of any police planes. The ray detected a squad of four planes flying west about fifty miles behind the liner, and flying much lower. They were being outdistanced rapidly by the cruiser, but the wizard thought they were too close to be comfortable, and he again switched on the telepathy ray, and under the guidance of his devilish brain the planes were turned north, and led away from the path of the swift air liner. When they were far enough out of the way to satisfy him, the telepathy ray was taken off, and the vision ray switched back to the speeding air cruiser.

This time the control room was placed on the scene, and Wallace gripped the arms of his chair, as he realized that he was about to see the manner in which all the previously raided air cruisers of the I. A. L. had been brought down. For ten minutes the ray was allowed to follow the cruiser, and no attempt was made to use the second ray. The clever wizard was biding his time. He no doubt would bring the liner down at a certain spot towards which the little white plane was speeding.

"We have a number of hours to wait now," the wizard said, turning to Wallace. "I will call you when something interesting happens."

Wallace rose and sauntered through the room, resting for awhile in his own.

Finally, a man appeared to conduct him back to the laboratory.

"We have the liner now," the old man said. "Watch it." Wallace put on the head set and saw the interior of the air-liner.

The pilot was leaning against the window of his room watching an occasional ship pass on the surface of the ocean far below. Occasionally his view would be ob-

structed by the clouds floating in the air below. He would see only a sea of snow-white clouds, reflecting the bright rays of the sun overhead, giving them a sparkling silver finish. An occasional glance at the cluster of meters was about all the pilot had to do during the swift, time-defying trip across the ocean.

Frank glanced over at his captor who was connecting the telepathy ray onto the vision beam. Then he turned once more to the scene before him.

The pilot was looking at the meters on the board, a slight frown came over his face, and he rose from his seat to study the meters closely. He seemed to have trouble in seeing, for he brushed his hand across his eyes and across the polished glass of the petrol supply meters.

"Good Lord," he exclaimed, "the petrol tanks are empty, we'll have to drop down and wait until we get a supply sent to us."

Reaching for the altitude meter he turned the adjustment key, setting the meter needle at zero or sea level. He then switched the automatic radio control off, and the monster ship tilted slightly forward on a long, slow descent. It gradually approached the surface of the water below. There was no call to the control room from the passenger deck, and no excited rush by the crew to determine the nature of the trouble. They all believed that the fuel tanks were empty, for the telepathy ray had everyone on the ship under its control. Scarcely had the craft hit the water, when the little white plane dropped down beside it, and the baggage room guards, under the influence of the telepathy ray, opened the door on the south side.

Frank was watching closely, he was positive that there was something behind the sending of the box on that cruiser, a trap of some sort. With excitement shining in his eyes, he watched the man step from his plane into the baggage room. The four guards stood obediently aside and the visitor, quickly spying the box, picked it up, tucked it under his arm and bowed himself gracefully out. A moment later the plane was climbing into the air again, and was soon lost in the clouds.

Frank's hopes sank within him, for he had counted on an attempt of some sort to battle the raider. He feared that Riel had planned such an attempt, but did not know the full power of the ray. And now, with the plans of the Light Wave Receiver in his power, the wizard was liable to do anything. He had obtained from the world all that he desired, and probably would start his reign of terror to show the multitudes his power. He was even likely to keep his threat of plunging the world into a gigantic struggle of extermination.

Closing In

WEARILY, Frank removed his head set, and turned around to see old Jolsen at his test bench, working on a box of electrical equipment. He was examining the wiring in the interior of the cabinet, carefully making adjustments and repairs.

"The plans will be here by three o'clock," he announced good naturedly, looking around at Frank. "I have a model of the Light Wave Receiver here. I copied it from the inventor's first model, by the aid of my vision ray. If I had had the other ray at the time I would have stolen the chemical formula from his mind. That is all I need to complete the receiver. The formula shows how to mix the chemical solution that is used to filter the waves through."

Frank turned once more to the vision ray. He knew how to control it now, and his strange host raised no objection, except to keep the controls of the telepathy ray secret. Swinging the ray along the sky, he soon succeeded in finding the raider plane, it was approaching the island. Gliding down onto the water, the plane was guided up to its place beneath the low hanging trees and the man stepped out and disappeared.

Not being familiar with the pressure adjustments, Frank was unable to penetrate the tree barrier, and he decided to wait until the man came into sight again. He wondered why the plane had come down by the island instead of speeding to the scientist with the coveted plans. He would have thought that the man was intending to wait until dark, so that there would be less danger of being detected. He discounted that notion when he remembered that the scientist had said the papers would arrive during the afternoon. Further, there was no need for the plane to fear any police while the ray was able to keep them off. He suddenly noticed something moving in the water, coming into view from behind the trees on the other side of the island. It was a submarine, cruising with decks awash, the observation tower only was above the water. It was moving swiftly around the island and was soon coming towards him, and he quickly guessed that the submarine was a part of the old wizard's equipment, used so that his location could be reached with little chance of detection.

Wallace followed the submarine for about an hour, then swung the ray idly through the sky, looking for new scenes of interest. His attention was drawn to a fleet of planes approaching, there were eight of them in the group, flying abreast of one another with a distance of one-half mile between them. As he swung the ray from side to side, he looked over the fleet, he could form no idea of their distance from him, but was thrilled to see that they were coming directly towards him. If it was an attempt to locate the base, he decided that he would assist them by letting them have the ray to follow.

Wondering if there were any more craft in the air approaching, he started swinging the ray around in a circle. Six more planes were approaching from the northeast. But to the north the sky showed no signs of any aircraft, although in the New York-London air lane, an occasional plane could be seen making the ocean hop. Around to the west the ray swung, and here he detected a group of about twenty ships spread out in the same formation as the fleet in the east.

His heart began beating quickly with the excitement, for there was no doubt of it now, they were all police planes. Those from the west he recognized as the American Atlantic police. He glanced over at the scientist, fearful lest the old man would get suspicious of something and take a look at the air. Then he shut the vision ray off, thinking there would be a better chance of the old man forgetting it.

For over an hour, Frank sat and watched the master working on his Light Wave Receiving device. And as the minutes passed he pictured in his mind the semi-circle of planes that were undoubtedly closing in on the wizard's base. How close the planes were he had no idea, but he was determined to do his best to keep the wizard's mind off the vision set as long as possible.

A red light on one of the panels of the main switchboard lit up and old Jolsen fairly leaped for the door which led to the small dining room, disappearing for a moment and quickly reappearing, carrying carefully

the box, that a few hours ago had been taken from the cruiser. With trembling fingers he tore off the cover, and began removing the papers on top. The box still contained much material for he had picked the drawing off the very top and soon a square package was uncovered. As he drew it out and began to carefully unwrap it, a look of suspicion came into his eyes. Quickly he went to the experimental bench and came back with a square cabinet with two meters on the top. Carefully placing the cabinet on the table, he turned a knob and looked at the meters. Both remained still but as he turned the knob further one moved over the scale to the right. His face turned white with anger, as he saw the needle move.

"They shall pay for this," he stormed, and springing to the vision ray, quickly adjusted his head set and swinging the beam across the sky soon spotted the British police planes.

"Oh, my hearty friends," he exclaimed, swinging the ray around. "It was clever of you to hide the radio set in the box of plans, but now that you have located me, you shall have another demonstration of my power."

He soon found the American fleet that were steadily approaching in the same order. The other odd planes now formed almost a complete circle around them.

"We shall witness another aerial combat," he said in a lower voice through the system, addressing Frank. "We shall pitch the British fleet against the American planes. They are well armed and we will be furnished with real amusement."

Escaped!

FRANK was frozen with horror. He made up his mind that he would not stand by and see the devil repeat the massacre. He would wait until the wizard was ready to throw the ray on and he would hurl himself on him in one desperate chance to save the fleet or keep the ray off them until they were overhead.

He thought little of his own danger, his main purpose was to prevent the deadly ray from being used. Quietly he disconnected his head set from the system, but still kept the mask on and watched the scene closely. The planes came closer and the wizard reached for the switch. He would wait until the old man threw in the switch as there would be time then to pounce on him and throw off the switch before the planes would meet. The switch moved under the finger of the gloating maniac, and with a twist was thrown in.

"Now watch them make a left turn," he chuckled.

Frank was poised in his chair ready to tear off the head mask. He relaxed a bit and stared into the scene, the planes were still coming ahead. The scientist opened and closed the switch again. The planes still came on, straight towards the ray. With an oath he swung the beam around to the American fleet and the telepathy ray was again switched on. Frank, with face set and heart pounding, watched. Would they defy it? Were both fleets protected from the ray?

Snap, the switch sprung into place, and two faces seemed glued to the vision reflectors. Frank's heart missed a beat, he breathed a silent prayer of thanks—the planes were coming on. With face white, and hands shaking old Jolsen threw off his mask and grabbing a tester from the bench sprang to the board, testing different wires and coils, and after making a couple of adjustments, returned to his chair. The ray was again trained on the British fleet with no effect. Like a group of merciless avengers they approached, defying anything to stop them.

A close-up of one of the planes was quickly produced by the now nervous scientist, and again the ray was turned on against them, but not even a wink of an eye caught the glance of the old man. He was beaten, his most powerful weapon was useless, and his avenging foes were tightening the circle around him. Carrying full bomb racks, they would soon be swarming over the laboratory with him at their mercy. He pushed a button and rising from his chair, hastily gathered up the Light Wave drawings as the butler entered. "Quick," screeched the old man. "Get the submarine for instant departure." The servant, with a startled look on his face, quickly disappeared.

The now thoroughly alarmed criminal took time enough to smash some of his most important secrets, and turned to Frank.

"Come on, hurry up out of this door, you're coming with me, you know too much to be let loose."

Frank was about to resist when two seamen entered the room.

"Hurry, professor, for they will soon be over us," one spoke to the old man.

Realizing the folly of resisting such a cold-blooded man, with two allies, Frank followed the two men out of the door with the scientist behind. Leaving the house, they started down a path between some tall trees, the two men in front broke into a run and were soon on the edge of the island where a small boat was beached. The submarine could be seen farther out in the water. Frank saw his chance, with a sudden twist he turned and before the surprised criminal had time to offer resistance, he was on him and they went down to the ground with a thump.

Frank heard the shouts of the two men and the pounding of their feet up the path. Desperately fighting himself free of the old man's clutches he sprang into the forest and raced for his life across the island. He knew that his foe's time was too precious to spend it in chasing him. Looking around he saw the two sailors struggling with the man down the path to the boat. He saw the boat put out and reach the submarine which, without a moment's delay, submerged. He scanned the sky and detected the small specks of the American fleet approaching from the west and forgetful of his own danger, leaped around waving his hands and shouting for joy.

With a deep hum, the planes approached overhead and commenced circling the island. A small dark object dropped from one. Frank saw it, and crouched at the base of a tree with his head in his arms.

B-o-o-m; the island shook from the impact. B-o-o-m, a second one burst close to the building with a blinding flash, tearing one side away. Another one came, a closer hit, and fragments of the building in which he had spent so many hours of mental torture, were hurled in all directions, the building became a complete wreck. Another blinding flash, a deafening, stunning roar, and Frank suddenly became dizzy. He groped for the tree, missed it and fell to the ground.

How Rial Did It

WALLACE'S return to consciousness was accompanied by a headache. He felt his head, there was a bandage around it. Lying still with his eyes closed, he soon recalled the events of the bombing. He listened, but all was quiet. Then the bombing must have ceased, he thought, wearily opening his eyes for a

second. He was forced to close them again because of the strong light that met his gaze.

"How are you feeling, old timer?"

A shiver of joy ran through him at the sound of the voice. It was Riel! Turning over on his side towards the familiar voice, he opened his eyes again. He was on a bed in a small room and Riel was sitting on the bedside. He raised himself up a bit.

"What hit me?" he asked.

"Fragment of a shell," Riel replied. "I was quite worried about you, as we dropped the bombs. But we had to do it. We dared not land, knowing the power and cleverness of the man we were dealing with. We had to take the chance and wreck him before he could turn some other infernal invention against us."

"Well I'm out of it, so that's that," was the smiling reply. Then Wallace added more seriously, "But he got away in the submarine?"

"Yes. One of the planes spotted him as he dived, but before we could get him, he had dropped so deep that we were unable to trace him. However, the planes are watching for him and we've a chance to get him yet."

"But tell me Riel, how did you buck that damned ray?"

"Well," replied the detective, "I had an idea when I first met you in New York that a ray was being used and I found proof enough during our trip to London. On reaching England I commenced to put into effect a plan that I had been working on, prior to my meeting you. This was a plan to make a person proof against the ray. The idea was to use a metal cap constructed of soft iron which I was sure would absorb the magnetic waves of the beam, and carry them around the head, and in that way prevent them from passing through and affecting the brain. To make a test of this cap, I ordered that special. You thought there were only two of you on the liner, but there were three for I was on board."

"You were?"

"Yes, I had my assistant prepare a corner of the baggage room for me and place a large cylinder of cast iron in the corner during the night. While you were asleep, I went out and had a metal cap made to fit my requirements, and stole on board the liner and crawled inside the large cylinder that was placed on its end. When the vision ray was put on the ship the next day, only the control room received any attention from the wizard, and I was not seen. The metal cylinder absorbed the ray as I expected. Of course, if he had used a greater pressure on the vision ray, he could have penetrated through the cylinder. But as it was, he didn't, for he paid little attention to any part of the liner outside of the control room. When the telepathy ray was put on, you two were effected, but my brain remained clear, which was proof that the cap was able to deflect it. Being free of the ray and having the spy under lock, I went ahead with my plans and preparations with little trouble after returning to London. I equipped a number of our police with such hats skillfully covered to resemble the standard police helmet, and had the Central Office inform the United States Secret Service Bureau of our plans with a suggestion to co-operate, and a request to equip twenty planes and crew to our specifications.

"The United States readily took part in our plans, and under my directions, equipped a fleet of planes. They also offered use of the light naval cruiser "Liberty," which is the world's swiftest boat of that class, on which you are riding now on your way back to New York. We then had both governments draw all air and sea craft from the zone where we had an idea the criminal's base was. We were about ready to send the box of plans which contained a radio set that gave out the signals, when the air tragedy took place, which one of our planes witnessed. That incident caused us to equip a much larger force with protective hats, the extra force to scout the sky and prevent any ship, caught by the ray, from doing any harm. Then men in our police ships, with clear heads, would be at an advantage over any plane under the power of the ray, and would be able to use paralyzer gas bombs on them, putting them out of commission long enough to allow us to finish the raid.

"The box we sent on the liner contained a radio device that was controlled by a sort of altimeter. The radio set contained a device with a set of codes on a cylinder which was run by clock-work. Ten different messages on this cylinder were each thrown into circuit at a certain reading of the altimeter. That is, when the radio box was on a plane at ten thousand feet, the meter reading at that point would cause the contactor to slide along the cylinder and send out a certain line of code. At sea level, the meter would read zero, and the contactor would shift on the cylinder, giving out a signal that we knew indicated that the box was at sea level. From the moment we placed the box of plans on the cruiser, our planes that were spread out all over the Atlantic between America and England, were listening to it and checking it on their direction and location indicating instruments.

A Matter of a Tin Hat

"AS the box was carried out by the cruiser, and later taken from the plane and speeded away, I sent out the necessary directions to the different planes telling them what distance to keep from the signals. Gradually we closed in the circle. I was about to give the signal to raid, when the sea level signal announced that the plane had come down, but I waited awhile and was surprised to notice it on the move again, and later the submerged signal told me that they were carrying the box below sea level on a submarine. I waited until the submarine came up and I heard the surface signal, then I took a chance on the submarine being near the base and gave the signal that they were all waiting for. In a few moments a semi-circle of planes were closing in on that signal box, with engines at full speed, each one anxious to get there first. The cruiser was only fifty miles from the spot when she got the signal and was there, almost as soon as the planes."

"But why didn't you tell me that you knew of the ray."

"It was because I thought the ray would be used to read your mind on the trip back to New York and if I had told you you would have had the thoughts in your mind all the way back. Again if I had told you of my plans to use the metal caps to outwit him with, you may have revealed our secret when he read your thoughts and he would have created a living hell on this earth before we would have had a chance to put our plans into effect. Then again if I had let you wear a metal hat, so that he could not read your thoughts, then he would have probably detected it before long."

"But how did you prevent him from using the ray to read your mind and learn of your plans. He must

have known that you were assigned to the job of tracking him down."

"Yes," the detective answered. "But I held one winning card, the Light Wave Receiver plans. To get them, he knew that he had to play a careful game."

"But he could have made you reveal the place where the plans were by using the ray on you."

"He had tried it on me but was careful to use a feeble power. He knew that if he used sufficient force to take control over my own thoughts, I would notice the effects and suspect that he was using such a ray. It was important that he keep it a secret at least until he obtained the plans from me. In other words he tried to get the plans from me without betraying his ray. However, he did use the ray on me with sufficient force to make me do his bidding, and that was when you and I gave up the papers on the liner coming to London. He was so positive that the plans were in the bag that he staked all on obtaining them. In that move he lost, while I obtained proof that he was using a telepathy ray. When he got the papers and found them valueless, it was too late, for we were in my house in London. He doubtless realized then that I had become suspicious of his ray, and fearing that I knew too much to be at large, he held up the cruiser that you were on, thinking that you were I. In an attempt, not only to remove me to where I'd be harmless against him, he also made one more attempt to learn from me the location of the papers before letting the world know of his ray. You know the rest. You know how he tried his last trick to get the plans, by trying to terrorize the police organization with his message, and how he thought he had succeeded, when we decided to send the plans and sent a message to that effect. He knew by then that I was aware of his ray and realized the power of it. He thought that I would give up the plans to prevent him carrying out his word."

"But your vision screen. Was it proof against the telepathy ray?"

"The magnetic field turned his vision ray, and the telepathy ray, left with no conducting path, was unable to penetrate the walls of the house with sufficient strength to be effective."

"Then he knew that you could stop his telepathy ray?"

"At that range, yes, but he no doubt knew also that I could not have used the field to protect the planes in an attack on him. For with the ray being used at short range, it would no doubt have been strong enough to break down the protecting fields. I thought at first of using the field as protection in an attack on him, but finding that it was not to be depended on at close range, I was forced to wait and find a better protection, which I did by use of the metal caps. So I believe that I did the best I could. It all turned out as well as we could have hoped for. We have broken his power, and he is being hunted by every power in the world.

"We have located the position of his second island by means of the signals received from the box, while it was being transferred from plane to submarine, and a fleet of planes have been sent over to it. He won't land there. And it will be difficult for him to get anything to build another base with when he finds the eyes of the world watching for him.

"The box that he got contained the genuine drawings of the Light Wave Receiver, but they are valueless, for I discovered that a radio company in France was making some secret tests on a new kind of wave, and some experts checking up on the signals received by the Light Wave Receiver found that they were those of the French station. Our master criminal was so positive of the power of his devilish devices, that he overlooked the most important thing. He forgot that there was a possibility of his power being checked by some little thing, say for instance, a little tin hat."

"Yes," came Wallace's drowsy reply from the depth of the pillow, "a little tin hat."

THE END.

WHAT IS YOUR KNOWLEDGE OF AVIATION?

Test Yourself by This Questionnaire

THE questions given below are taken from the stories in this issue. They will serve, by your ability to answer them, to test yourself in your knowledge of aviation. By thus testing yourself, you will be able to fix in your mind a number of important facts of aviation that are presented by the stories.

The pages, on which the answers are given, follow each question.

1—What is the purpose of the magnetic beams in aviation? (Page 163)

2—What is the purpose of the catapult? (Page 163)

3—What is the advantage of the multi-motored plane? (Page 163)

4—What disadvantages have the lighter-than-air ships? (Page 133)

5—How can one, in a flight from London to New York arrive at the same hour he left? (Page 147)

6—How might a gyroscope control the motion of an air vessel? (Page 105)

7—What changes in sensation would a person have in a ship insulated from gravity? (Page 107)

8—What means of propulsion have planes other than propellers? (Page 116)

9—What is an up-draft? What would be its effect on a plane? (Page 120)

10—What is the fate of an object caught in the earth's atmosphere stream? (Page 128)

11—What would happen to a plane headed upward if the "stick" refused to move? (Page 156)

Beyond Gravity

(*Continued from page* 131)

have to wait until we have observed his condition before you can see him. Will you please wait in the anteroom? We will call you after the examination."

"That's right, Joan dear," I said, taking her by the arm, "Perhaps Bob should not be disturbed now. Let us wait."

As we walked toward the end of the long ward, I noticed signs of life in the forms laying between the sheets on the cots. Nurses here and there were holding glasses of water to the patients' lips and I felt encouraged. But Bob Allison had been injured, I remembered. These men, I presumed, had not. That much out of his favor, yet I could not suppress a feeling that he would live.

For what seemed hours, we sat in the anteroom of the government hospital nestling almost under the rising dome of Point Loma. Joan stared straight ahead of her in stony silence, I toyed apprehensively with my helmet. Occasionally the door opened and nurses entered the room and departed, saying nothing to us. Presently the knob on the door leading out into the field opened and I was surprised to see the portly frame of my dear friend Senator Allison, enter it. With a stride I was at his side, gripping his hand. Joan sat unmoved.

"Jim Holdon!" my friend said, surprised. "Where's Bob, Jim? Don't tell me he is————. Have you seen him, Jim?"

"Well, Frank," I said. "I cannot say. Joan and I are waiting until he has been examined. But I have a feeling that he'll get along."

"You've seen him, Jim? He asked, staring at me questioningly.

"Y-y-yes, Frank," I answered, evading his eyes, "I-I-have seen him."

"Is that Joan sitting over there, Jim?" he asked, suddenly.

"It is, Frank," I answered. "She's taking things pretty hard. Bob stopped to see us in Denver just before the *Annihilator* took off and was drawn into the up-draft."

I turned to Joan and nodded. She came forward falteringly.

"Joan, dear," I said, placing an arm around her waist. "This is Bob's father. You remember him, don't you?"

"I'm pleased to see you, Senator Allison," she said, "and I am very glad you are here. I was wondering if you'd come."

"I came as soon as I could," he said. "You've grown to be a beautiful woman, Joan. You were just a little child when I saw you last back in Washington."

"Thank you, Senator," she said, hanging her head modestly. "I'm getting impatient waiting for them to tell me that we can see Robert. Can't you do something? This suspense is terrible!"

I winked at Senator Allison. His brows went up in understanding surprise.

"I want to see him too, Joanie," he smiled, anxiously, "But I think it best to wait until they call me."

"I think so, too, Joan." I put in.

"Well, alright I'll have to————"

Before Joan could finish her resigned sentence, the door opening from the ward swung wide and a nurse stepped in, smiling. We stared at her questioningly. Her smile made my hopes race high.

"Lieutenant Allison is doing nicely," she said. "You may see him now." She beckoned us to follow her.

Not knowing what to expect, we walked tensely through the door and into the ward. The cots were filled with sitting and reclining men, some smoking and chatting with their friends. How quickly they had cast off the death-like embrace of unconsciousness, I thought as we walked between the rows of cots.

Finally the nurse halted in front of a door beyond the ward and stood by while we entered. I held Joan back just inside the room, while Senator Allison walked noiselessly to his son's bedside. Bob lay motionless and pale and I was suddenly filled with fear. Joan sobbed softly. Senator Allison bent over and kissed his son's white forehead, sudden tears streaming down his cheeks. A lump rose in my throat and I looked away.

I felt tempted to take Joan by the arm and hustle her from the doorway. It would be very hard to look upon the death mask that I felt had closed Bob's eyes forever, and in reverence I wanted to depart and leave his father alone with him. I lifted my hanging head and looked out into the hallway for an instant and then Joan tugged at my arm. I turned. There was a movement under the bed coverings as Bob lifted a hand out of their confines. His eyes opened and closed weakly as his hand met his father's shaking palm.

"Dad!" he said, weakly. "You've come!"

"Yes, son," his father whispered. "I flew here as fast as I could. How do you feel, Bob?"

"Oh, I'll get along alright, dad," he managed to smile. "My chest pains a little, but that's to be expected. Have you seen Joan Holdon?"

"I have, son," Senator Allison replied with a happy grin. "She's here waiting to see you."

Joan flew from my arms to the bedside and kneeled down beside it, sobbing.

"Joan!" Bob cried, softly. "I've been hoping you would come."

"Oh, Robert!" she sobbed, "You don't know what I've gone through——with you hurt and beyond my reach. It's been so terrible!"

"Everything is alright now, Joan," he whispered, placing a hand on her head and lifting her face up to him. "I think it was rude of me to get hurt after asking to take you to a dance with me. Perhaps you will dance with me later, Joan——will you?"

Senator Allison motioned me to follow him out of the room. We stepped out as Joan kneeled closer.

"Yes, Robert," she said, blushing. "I'll dance with you————all through life if you will hurry and get well."

"I can't help but get well now, Joan dear." Bob smiled happily.

THE END

AVIATION NEWS OF THE MONTH

CONSTRUCTION

Oil Airplane Engine Reduces Flying Cost

THE details of the Diesel airplane engine development by the Packard Motor Company reveal that the cost of fuel shows a considerable reduction from that of the ordinary airplane engine. On a test flight from Detroit to Langley Field, Va., the fuel used was $4.60 worth of crude oil against an ordinary gasoline cost of $21. Eighty gallons of crude oil would carry a plane equipped with the new motor as far as 100 gallons of gasoline. The crude however weighs about a pound to the gallon more than does a high-grade gasoline. Large scale production of the motor at the Packard Company plant is now in progress.

Safety Devices Aviation's Greatest Need

DEVICES that will increase the safety of planes and prevent the spins that cause so many accidents, are declared by Professor Edward P. Warner, former Assistant Secretary of the Navy for Aeronautics to be aviation's greatest need. Professor Warner was speaking at the yearly gathering of aviation executives and scientists at Langley Field, Virginia. Research work is already progressing in an attempt to promote air safety. Another need expressed is that of instruments which should warn a plane of the nearness of another. This will become increasingly important as the number of planes in the air increases. Studies of the effect of ice formation on planes were also made and the effect of air velocity on propeller efficiency was studied in a gigantic wind tunnel where a plane was mounted in a twenty-foot air stream travelling 100 miles per hour.

Folding Wings Found Advantageous to Flyers

AS a result of a survey made by the Fairchild Aviation Corporation, planes having folding wings are shown to be much more advantageous to flyers than those not similarly equipped. The crowded condition of many hangars makes the possibility of an itinerant flyer finding space for his craft very unlikely. But of the flyers who have reported in the survey, many have been able to get "parking space" with folded wings when other flyers have been turned away. Furthermore, since most airports have a storage charge, depending on the wing spread, a great saving in rent is afforded those having folding wing planes. In many instances the reduction has been as much as fifty per cent.

Airplane Engines are Inexpensive

ANY popular opinion to the contrary the factory cost of airplane engines per horsepower is considerably less than that of marine engines and approximately on a par with that of railroad locomotives, asserted George J. Mead of the Pratt & Whitney Aircraft Co., in a paper delivered by E. A. Ryder of the same company before the Milwaukee Section of the Society of Automotive Engineers.

The usual cost of $18 per horsepower for airplane engines is much lower than for marine steam and Diesel engines, which Mr. Ryder gave as $135 and $145 per horsepower. The locomotive was listed as costing $30 per horsepower, including the tender. The miles per overhaul of the aircraft engine were given as 30 000 to 50 000 miles, compared with 30 000 miles for a car engine, 100 000 for the locomotive, and 10,000 for the automobile.

Gigantic Bombing Planes for Next War

A NINE-TON automatic plane, carrying bombs which will have attached to it a smaller plane containing the pilot is pictured for the next war, according to an article in *Air Transit News*. The monster would weigh 24,000 pounds in all and hold 2,400 pounds of high explosives. Already tests have been made on the control of planes from the ground, and the proposal made by Lester Barlow is for the giant ship. There would be two separate planes, the one for explosives and the small ship for the pilot. The smaller is carried under the latter in the undercarriage. After the pilot has launched the larger in the air, set the automatic controls on its destructive path, he can be released and fly back. The author of the article pictures hundreds of such machines flying over enemy territory, and at a predetermined point dropping their terrible bombs over an enemy city or territory. Such craft would have a range of 1,000 miles.

Baboon Sees Auto-Plane in Future

THE day of the small plane is approaching, says Roger Babson, business expert, according to *Air Transit News*. Its coming will influence considerably our national life. The plane he visions will rise and descend vertically, will have folding wings, will be able to land on water and run through the streets like an auto. In the future, the chief means of travel on land, air and water will be the airplane. Because of the increase in air traffic all wires and smokestacks will be removed and an the campaign for smoke prevention and better-looking cities will be aided.

Army Tests Propellers in Bomb-Proof Shelter

IN a $1,000,000 plant dedicated to aeronautical research, the Army Air Corps will begin a series of tests to promote greater safety for commercial aviation. The first tests will be of propellers, in a bomb-proof shelter capable of withstanding the impact of a 16-inch shell. Here on three giant stands, three specially designed motors of 2,000 to 4,000 horsepower will whirl their propellers at from 720 to 4,000 revolutions per minute until the propellers explode. By this means the stresses exerted on propellers and their ability to withstand them will be determined. An exploding propeller is a bad source of danger in accidents, for the propeller with the force of a 16-inch shell might cut through the fuselage very easily. Every phase of aeronautics will be investigated, the design of planes, structures, wing structures, etc.

Three Miles a Minute for Future Planes

THAT with the increasing monster applied to airplane design, the plane of to-day will seem quite antiquated ten years hence is the belief of John K. Northrop, chief engineer of Avion Corporation writing in the New York Times. With the decrease in weight of planes by the use of new strong alloys such as duralumin, other alloys and lacquers, the drag on the plane has been reduced. By the introduction of enclosed motors of the "Antoinette" type, the parasite resistance of exposed motors will be done away with. Three miles a minute should be the cruising speed of planes of the future with an altitude of 15,000 to 20,000 feet above sea level. At this level the resistance is less and greater power can be developed.

Foolproof Plane Successfully Tested

A PLANE which can neither stall nor spin, a tailspin has been successfully tested at the Hoboken Airport by the Curtiss Aircraft Corporation which has the American rights for it. The plane is a Belgian and is known as the E. S. 1. It has interchangeable wings and can be used as either a monoplane or a biplane. It has been used for four years by the Belgian Air Force as a training plane without a single mishap. During the tests the pilot put the plane through every conceivable stunt to try to make it stall or spin but it refused. He even throttled it at the peak of a steep climb but the plane recovered and went into a glide. Operated as a biplane it has a very slow landing speed so that it can be landed "hands off." Then it can be operated as a speedy monoplane.

New High Speed Boeing Plane

PRODUCTION will soon begin on a large scale of a new plane by Boeing built on the type used by Captain Baker on his Panama-United States dash to down flight. In this flight Capt. Baker obtained from it a speed of 172 miles per hour. The new plane will be a single seater with an overall wing span of 30 feet. It is quite similar in design to the large number of Boeing pursuit planes used in army maneuvers. It will weigh 2,400 pounds completely fueled and be powered with a 600 horsepower Pratt and Whitney Wasp motor. It will have a black fuselage, red tail and cream wings, struts and landing gear.

Airplanes Smaller and Larger

TWO definite trends in airplane design toward smaller and toward larger units are perceptible to Elmer Bond, president of the American Aeronautical Corporation as reported to Aero Digest. The first tendency, toward small planes is aimed for the use of sport and individual flying. These planes according to Mr. Bond will have a power of from 90 to 100 horsepower. They will be light, swift and inexpensive. The second tendency toward the heavy powerful craft is for use in commercial and mail service. These planes are being built with power plants of 1,000 horsepower or more. They are however more efficient, per pound of plane, than the smaller units. The building of the powerful plane is particularly necessary for seaplane service where the rough water will often hinder the take-off, unless sufficient power is developed.

New Monster of Air to Come

AS a result of the air maneuvers of the Army Air Corps a new monster fighting plane of the air is likely to evolve which will make warfare a more terrible thing than ever. It will be a great armored bomber carrying a heavy load of destructive bombs and yet equipped with plenty of machine guns to protect itself against light enemy aircraft. It was found in the last war that the heavy moving bombers were easy prey to the light pursuit planes of the enemy, and the bomber could be destroyed before its protecting planes could get into action. Now the bomber will be its own protector; and invincible against all ordinary aircraft it will sweep over enemy territory with its great bombs released on the way. Then there will be in the new scheme a fast bomber carrying lighter bombs, a speedy pursuit plane, and high altitude planes for making observations. Tactics and strategy of the air with mass movements will be the feature of the next war, instead of individual feats of mastery.

OPERATION

Landings Atop Buildings Being Tested

THE feasibility of landing and making a take-off at a [illegible] on the tops of large buildings in congested areas of large cities is being tested by the American Air Transport Association. The importance of such tests is equal to that of the end to be gained—the long awaited solution of the air traffic problem. The device being used in the test is a platform 210 feet long and 60 feet wide. It would revolve allowing a plane to take off with the wind. It would also be inclined 35 degrees allowing him to start his take-off at the top of the incline and be assisted by the force of gravity. To land the plane he would land at the foot of the incline and be gradually stopped by a series of spring cable controls. A huge reversible fan would also be used to create a current to keep the plane from bounding off after landing.

Mail, Not Passengers, Profitable Says Zeppelin Director

EVEN at $2,000 a head as fare to carry passengers across the Atlantic, passengers are not as profitable as mail, declared Director Colsman, of the *Graf Zeppelin* organization, as reported by Wythe Williams to the New York Times. For the space that he occupies, for his weight and the weight of the food, his bedding equipment and other accessories of his comfort, the passenger decidedly takes second rank as against mail or even freight. Dr. Colsman remembers that on the average an ordinary sailing contained to continental services would be only half filled, thereby reducing the average fare to $1,000. On a South American trip the fare per passenger would be only $7,000. For this the passenger with all his accessories takes up 1,100 pounds. Fifteen passengers on an average therefore, would net the company $15,000. Only the 16,500 pounds they take up. If the ship were to carry 200,000 letters, however, which would take up only 4,000 pounds, the company would receive, at twenty-five cents per letter, $25,000. From a standpoint of direct revenue therefore, passenger business is not profitable.

Plane to Meet Ships 250 Miles at Sea

A SHIP-TO-SHORE service will be established shortly on the United States Lines, Inc., which operate the *Leviathan*. The plane will meet the ship 250 miles at sea, swoop down and pick up mail without stopping. By this method a whole day is expected to be cut from trans-Atlantic mail time. Further, a plane can leave the Newark airport, which will be the eastern base and carry mail to the ship 6 hours after it has sailed from New York. With a ship like the *Leviathan* 250 miles out, the plane travelling at 150 miles an hour would pick up mail from the ship, and return to the base all within four hours. A huge Bermuffi plane, one of the largest built in this country, will be used to inaugurate the service and will have a cruising radius of 4,000 miles. It is also believed that the plane will deliver and take off passengers from the ships thus allowing a late arrival to catch the ship long after it has sailed, as to be landed in New York hours ahead of the ship, if he is in a hurry.

War Games Prove Value of Planes

THE results of the Ohio aerial manoeuvres have proved beyond question the ability of planes to perform what is required of them. The "battle" fought according to Major General Mitchel, for the higher tactical instruction of general officers, has evoked many interesting conclusions. The "bombing" of New York was carried out by Lieutenant Moon, despite many difficulties. His refueling plane by which he was to be refueled in the air forced down by bad weather as well as his refu'e plane, he was still enabled to accomplish his mission. The result anyway was to prove the value of navigation and radio in plane manoeuvers. The lessons learned by the warfare are three. First, that it is feasible to concentrate aircraft from all parts of the country at a central point, despite adverse weather conditions. Second that it is possible for craft to carry on operations in weather far from favorable. Third, that the employment of the air force is quite satisfactory. For the manoeuvers practically all the available fighting forces of the country's aircraft was concentrated at Patchett Air Depot and Norton Field (Columbus, Ohio).

Motorless Flight with Gliders

DR. WOLFGANG KLEMPERER, who is closely identified with the great development of interest in gliding and soaring in Germany and is now in this country promoting glider activities and assisting the Goodyear Zeppelin Corp., stated at the recent aeronautical meeting of the Society of Automotive Engineers in Detroit that the glider has advantages for the study of design as it is simpler and safer than a power machine for making experiments and is also valuable for gaining experience in landing. The glider always takes off to make an emergency landing. Tailless and gull-winged planes and slotted wings were used in gliding before they became practical on power planes.

The principle of static flight in steady currents of air on the windward side of a hill, along the seashore or at the ridge of a wood runs faster than the glider descends by force of gravity. By steering along the edges of a range of hills and making figure 8's the pilot can cover enormous distances for hours and cover considerable distances.

The duration record is now over 36 hours, the distance record over 65 miles, and the maximum speed between 60 and 65 miles per hour, mainly laterally in the wind. There are places in America, and Darton Kleinpeter where it is feasible to make a glider flight of 100 miles, and he believes it is possible to make a flight from Los Angeles to San Francisco.

"Aviation News of the Month"

portrays in plain, yet concise language every important aviation advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 40 aviation magazines and newspapers are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, makers and distributors of planes, etc.

Safe Flying Lies in Better Instruments is Belief

IN order to test whether the safety in flying will be increased by the use of better instruments, Lieut. Alfred F. Hegenberger has been assigned to Wright Field, Dayton, Ohio, to conduct a series of experiments says *Air Travel News*. Lieut. Hegenberger was the navigator of the first plane to fly from America to Hawaii and is an exponent of the "better instruments" idea. He believes that the magnetism of the earth can be used to hold planes to their course and that by devices attached to the earth inductor compass, a large part of the human element can be avoided. Planes, equipped with the earth inductor compass, will merely set the compass for their route and the device on the compass will correct the plane if it goes off the route.

New Parachute Can Support Plane

A NEW parachute, 24 feet in diameter, has been designed by Major E. L. Hoffmann of the Army Air Corps, which is capable of supporting an airplane in the air and letting it down gently, says *Air Travel News*. A recent test was made of it by hanging on to it a 1400 pound bomb from an altitude of several thousand feet. The parachute let the bomb down to the ground gently but then made trouble was had on getting the 'chute to release the bomb. There was a tendency to drag it over the field despite all the efforts of the attendants. The Air Corps is now at work on a device which will automatically release the weight on reaching the ground. Otherwise, due to the tendency of the 'chute to race across the ground with its weight and its unwilling mate to deflate, it will be useless.

"Flat Spin" to be Studied

STUDIES of the peculiarities of the "flat spin" which occurs to planes, often with serious results, are being undertaken by the National Advisory Committee for Aeronautics at the Langley Field laboratory, says a despatch in the New York *Times*. A vertical tunnel will be constructed at a cost of $12,000 to aid in the laboratory tests. It is believed that study of the flat spin might lead to a method of utilizing it for better landing of planes. Means have been found to eliminate the spin where it is desired, but the possibility of putting it to beneficial use seems to the experts. It has been found very often in military maneuvers that planes which cannot spin are at a disadvantage, for many an aviator has been able by a spin to work himself out of a tight place.

Albany-New York in Half Time Now

AN illustration of how quickly the speed of our best trains is becoming antiquated came with the test of an air liner, plying from Albany to New York, with the Twentieth Century Limited. The plane left New York, arrived in Albany, exchanged greetings with the mayor and returned to New York in 187 minutes. The time consumed by the Twentieth Century is 171 minutes from New York to Albany. The plane is one of seven which will begin a regular New York Albany service to run on a scheduled time of seventy-five minutes between the two cities.

Four Day Service to Hawaii Now

AIR mail, freight and passenger service between San Francisco and Honolulu on a thirty-six hour schedule is the plan of the Goodyear-Zeppelin Company. With New York now only 32 hours away from San Francisco, the company officials expect that a 36-hour service from the West Coast to Honolulu will put Hawaii within four days travel of New York. The company is at work on two lighter-than-air ships with which they expect to inaugurate the service. These ships are being constructed simultaneously with two gigantic navy dirigibles at Akron, Ohio. Akron, it is expected, may be the eastern terminus of the air line. The first ship will be launched in the spring of 1931 to be followed 16 months later by the second. The dirigibles will be almost twice the size of the Graf Zeppelin, having therefore a capacity of about 7,000,000 cubic feet. They will be filled with helium instead of hydrogen. The United States has already enough helium to fill our airship needs, and in fact our supply of it will make us the world center to fill the needs of the rest of the world. The company is negotiating for a contract to carry government mail across the Pacific. If the line proves successful it might be extended to the Orient and Australia. Thus with the English air lines that have been established to India, travel across three-quarters of the globe by air will be possible.

Radio Sky Road Hoped for Aviation

THE construction of a road in the sky for aircraft by means of radio is the plan on which aeronautical and electrical engineers are working. In the recent war games where a bomber made his way to New York through adverse weather the communications by radio informing the bomber of his position and the weather ahead at all times, proved its worth. The army bomber used non-directional radio. But what the engineers hope to do is to build directional beams in the sky by which an aviator can hail at all times whether he is on the right path. Directive beams have failed in the past because they had a tendency to dip into the ground when they approached any distance. Recently however two National Air Transport pilots flew "blind" with the aid of directional beams. One of the pilots traveling from the Cleveland Airport to Hadley Field, N. J., landed at Bellefonte, Pa. where he was informed that the weather was almost impossible to see through. The pilot however went on through the fog where beacon lights were hidden and he was guided only by the radio beam broadcast by the Department of Commerce and the plane concentrated only on the dots and dashes coming from the receivers clamped to his ears. These dots and dashes told him on what side of his path he was. He traveled safely through the fog and landed at Hadley Field.

(Continued on page 189)

THE READER AIRS HIS VIEWS

IN this department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If any fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brickbat.

All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

Favors Aviation Course

Editor AIR WONDER STORIES:

I have just received the first copy of Air Wonder Stories so I have not had a chance to read it as yet. I have a suggestion to make which I think would please many of the readers of this magazine.

Why not use a page or so from month to month and give the readers a *course in aviation* so that the ones that are not up to the minute in aviation would understand just what happens when a plane flies. Also it would be a good start to persons who intended to take up aviation as a business or career and would make the students think a little more deeply on the subject.

I am very much interested in aviation myself and hope you will be able to do this.

The idea of putting the authors' pictures with their stories both in Science Wonder Stories and Air Wonder Stories is a good one. It gives the readers a chance to be almost personally acquainted with the writer of the stories.

Wishing the magazine success.

ANTHONY SAMARTINO,
Philadelphia, Pa.

(As Mr. Samartino will notice, beginning next month there will be an "Aviation Forum" in which any reader may have answered any question on aviation. We believe in this way that the educational value will be given according to his wish. Later on there may be the possibility of extending this department. Nevertheless we appreciate Mr. Samartino's suggestion.—*Editor.*)

Questions "Men With Wings"

Editor AIR WONDER STORIES:

I have just finished reading the first issue of Air Wonder Stories and while they are fresh in my mind will render my opinion. I must say that you have a wonderful magazine. I believe there is nothing like it on the market and it was a rare experience for me. I see that you are publishers also of Science Wonder Stories so will [illegible] to buy. I don't know which I will like better.

Now as to the stories. "The Ark of the Covenant" is a great tale. I've got my own theories about the relics etc. which I don't want to give away yet but that part Melchisedec certainly keeps one guessing. You editors must be cruel to make a whole month pass by before I can go on with it.

"Islands in the Air" was also very good as well as novel. It was very well written, anyway. "The Beacon of Airport Seven" kept me guessing up until almost the very end. And say, that beacon was the most eerie thing. I would like to see more from Mr. Sykes.

From what I see in the newspapers, "The Bloodless War" isn't so far fetched. In fact, I think that with Congressional indolence that what Mr. (or I see it is Doctor) Keller pictures may happen. Certainly a rich country like ours is an inviting morsel. And how can we be attacked these days except through the air?

Now I come to "Men With Wings." Although I liked the story as a story I can't just realize the science of it. Just think, putting wings on men. It's a little too much. I think that Miss Stone was piling it on too thick there. For even if it were possible at all (which I doubt) it would take thousands of years to do.

Well the "Aviation News" was very good. Give us some more of it. Also I would like to see a questions and answers column for we fellows in aviation. I've got a lot of things I want to find out.

I guess I've rambled quite a bit, but I want to say in conclusion that I like your magazine despite the punk column in "Men With Wings."

HARVEY BRITT,
New London, Conn.

(Mr. Britt's kind comments are quite welcome. Regarding "The Ark of the Covenant" the editor has had numerous requests for more stories like this one and will endeavor to do so. Regarding "Men With Wings" I ought to call Mr. Britt's attention to the notice regarding a department for questions and answers such as he speaks of.

The editors liked "Men With Wings" and believe that the element of it which absolutely is still sound. The knowledge that we have of our bodies is still of the most rudimentary nature. We are just beginning to become acquainted with the all important glands, we are still dimly conscious of the actual presence of our emotions. We are in brief still ignorant of what we are and what we can become.

But we still know that gland secretions affect our lives greatly. Their presence can lengthen and very often our mental capacity. And now coming a case to England as well as through physical gland secretions a surgeon hopes to alter character somewhat. It is therefore not at all to be ruled out a great amount of existing knowledge about glands regulate the size of beings. Then he was right to experiment with men. Miss Stone, we believe, was very scientific in her picture. She showed the evolution as a gradual one with all the alternations of hope and fear that accompany actual experiments. And it was only after several generations that the *aloted* appear. If men with wings and want them badly enough we believe that it is probable that he shall have them.—*Editor.*)

Gravity Repulsion Seems Fantastic

Editor AIR WONDER STORIES:

It is one thing to deal with possibilities of the future, but it is quite another to attempt to palm off on readers fantastic absurdities, concocted in the feverish brains of over-imaginative writers.

I picked up your Air Wonder Stories mildly interested to see what the new work had brought to the newsstands. You know there is a weekly crop of magazines, that like the harmstorming fairies come to make a one-night stand. I thought your magazine was one of these.

I found some stories that were fair some good and a third mighty good—namely, "The Ark of the Covenant." But my digressive faculties rebelled at the assimilation of "Islands in the Air" and "Men With Wings." I must therefore voice my rebellion.

One of the most fundamental laws of the universe is that of gravity; the attraction between two bodies being proportionate to the product of the masses and inversely as the squares of the distances. There are no ifs, ands or buts. It is a rigid, inflexible law. Gravity does not depend on any medium for its transmission and therefore it cannot be shielded. It strikes me therefore that Mr. Morrow must have had a pipe dream.

As for "Men With Wings," well, words fail me. Remember, I don't criticise the story as it was well written and worked out nicely. But I thought that the growing of wings was a relic of the days of mythology. I am open to reason on the subject. In fact if there is any place where they are sold I might be inclined to buy a pair myself. Or invest a few hundred in "Wings, Inc." common. But seriously, it seems like reverend mythology, nothing more.

I am intensely interested in the magazine however. The Aviation News was very well done.

GEORGE WILLNER,
Bronx, N. Y.

(The criticism of "Men With Wings" has been answered in our comment on Mr. Britt's letter. Regarding the concept of "Islands in the Air" we call attention to the latest theory of Einstein. Gravity, Einstein says, is magnetism, and therefore, as such, is susceptible to the same laws. In a recent demonstration cobalt-steel was shown to have the property of acting as a gravitational shield. The exact limit of the power of cobalt-steel has not been determined. We do not suggest that gravitational repulsion will come through the use of cobalt-steel as a shield but in exactly the manner that H. Morrow suggests. But we do state emphatically our belief that man will eventually have enough power generators to supersede a fuel [illegible] used by Mr. Morrow. With the consequent effect of our [illegible] knowledge perhaps we shall have an [illegible] in every [illegible], and with each one start off with the knowledge of the other and adding to it his own genius, the mysteries keep that govern our universe are surely going to be stripped of their cloud of darkness and be unveiled to the light.—*Editor.*)

Voices Heartfelt Appreciation

Editor AIR WONDER STORIES:

Permit me to voice my heartfelt appreciation for the opportunity to read your most entertaining first issue of Air Wonder Stories.

I was especially interested in "Men With Wings." I believe that your author has presented a picture which should strike home to everyone. I take it that Miss Stone meant the story to have not only a human but also figurative meaning, the latter being the more important of the two, for progression to mother and otherwise accomplishment is worth while. She drew a masterly picture of the group of idealistic people endowed with the wings to soar above the earthly aspiration of their neighbors.

WALLACE MEEGHAN,
Chicago, Ill.

(We appreciate Mr. Meeghan's nice words. They are very stimulating. We are in entire agreement with his views on "Men With Wings." He has seen deeply into the heart of the story. We believe that if everyone will do the other thing it will give man a new concept of existence to a degree that he has never had before. Having seen the sun and even at times from the height of [illegible] can be assured [illegible] a new perspective of it and a new existence. Until the advent of a way to supply him [illegible] the road to material and spiritual progress.—*Editor.*)

Air Wonder Stories a Huge Success

Editor AIR WONDER STORIES:

Congratulations — your first issue of Air Wonder Stories is certainly a huge success. It contains the best collection of air stories that I have ever seen gathered together in one magazine. In trying to determine the best story I think that it is a close race between "The Ark of the Covenant" and "Men With Wings." The story "Men With Wings" does not contain as very much science but it is an excellent story.

I think that Dr. [illegible] Keller is one of your best writers whenever I see a story by him I know that I am in for a treat. I do not know if H. H. K. [illegible] (other of the "Men With Wings") stories [illegible] but I do think that one of them should be a while would put an entire book into the magazine.

I am a subscriber to Air Wonder Stories, Science Wonder Stories, and Science [illegible] Quarterly. I would like very much to know if you are going to put out a quarterly, semi-annual or annual to the Air Wonder Stories?

Hoping you great success for all three magazines.

ALBERT TAYLOR,
Jacksonville, Texas.

(Mr. Taylor's letter is typical of so many that we have received during the week on the first issue of Air Wonder Stories. The reception that the first issue received was very encouraging. It looks as though Air Wonder Stories will become one of the potent factors in aviation in this country, pointing the way toward future developments. An announcement regarding a possible Quarterly or Annual by Air Wonder Stories will probably be made in the near future.—*Editor.*)

(Continued on page 180)

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By Charles H. Colladay

Collisions between celestial bodies of any size have not occurred within historical times. But such an event is not an impossibility. In fact many astronomers believe that our solar system came into being by such a collision. Suppose the moon were to crash into the earth What would happen? In "When the Moon Fell," by Charles H Colladay you will find the answer

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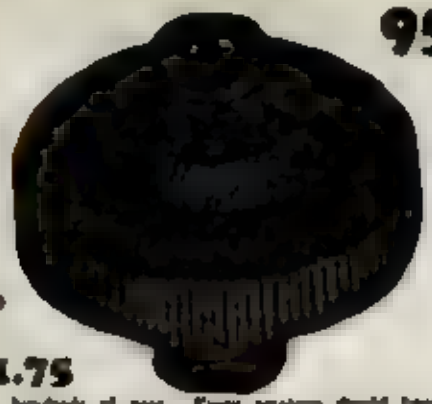

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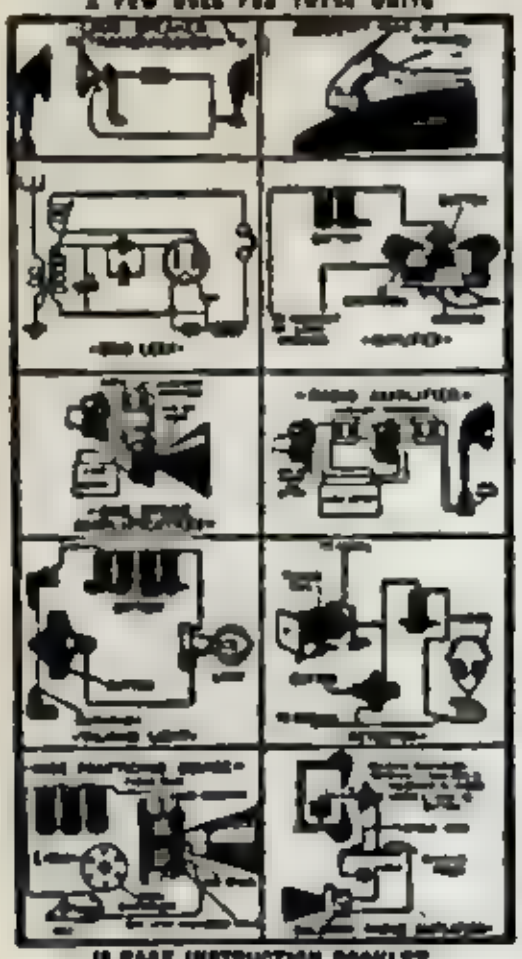

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LETTERS FROM OUR READERS

Comment on this Issue

How a Plane Operates

Editor AIR WONDER STORIES:

Air Wonder Stories is alright. Victor MacClure, Morrow, Sykes, Keller and Stone are all, in my opinion, first-class authors. I enjoyed each of the stories immensely, even though I knew very little about aviation.

In your stories I felt as though I were up in the clouds, flying with the characters, and could look down and see the landscape spreading out for miles around me. Then I would say to myself, "Well, here I am; I've realized my ambition to fly, but how does the darned thing work?"

Since you have been a beacon of enlightenment on scientific things for many years, I take the liberty of asking you a few questions about the operation of the airplane.

1. What is it that makes the thing go?
2. Since the plane is heavier than air, what keeps it in the air?
3. What is it that steers the plane; what makes it go up or down or turn it left or right?

If you can find space in your columns, I would appreciate very much an answer to these questions, as I know there are a great many like myself who are anxious to learn.

BENJAMIN JENKINS,
Los Angeles, Calif.

(We might say that we have anticipated the requests of men like Mr. Jenkins, who are eager to learn the why and wherefores of aviation, and are beginning with the September issue, a department called "Aviation Forum," in which all questions on aviation will be answered. For this purpose we have gathered about us a staff of aeronautical experts to assist us in conducting the department.

The answers to Mr. Jenkins' questions are as follows:

1. The propelling force of a plane is, of course, an engine which rotates a propeller. The propeller, in cutting the air at a great speed, like a screw, works columns of air backward and draws the plane.

2. The sustaining force for the plane is the air pressure under the wings. In other words, the velocity of the plane through the air creates a pressure of air which, acting against the wings, sustains the plane. Since the air pressure is dependent on the velocity of the plane, and since there is a minimum air pressure necessary to sustain the plane, there is a minimum velocity at which the plane will remain in the air.

3. At the tail of the plane is a vertical, movable vane, called the rudder. If the foot-bar in the cockpit is depressed with the right foot, the vane is swung toward the right. That creates an added pressure against the right side of the vane which swings the tail around to the left, and therefore turns the plane around to the right. The opposite would be true in depressing the left foot bar.

At the tail of the plane is a horizontal movable vane. When the pilot moves his control stick forward the vane is lowered. Therefore there is an upward pressure on the vane which tends to lift the tail. This turns the nose of the plane down and thereby sends it toward the earth. The opposite would be true by pulling the control stick back.

For "banking" the plane, that is, turning the thing on its side (which is necessary when changing direction at a high velocity) there are the ailerons, one located in the rear of each wing. By moving the control stick to the right, the right aileron is lifted, and the left one lowered. This creates a downward pressure on the right aileron and an upward on the left one. Thus the plane banks to the right. To bank to the left the control stick is moved to the left.—Editor.)

The Best Aviation Magazine

Editor AIR WONDER STORIES

I have read through Air Wonder Stories from cover to cover and pronounce it the best aviation magazine I've seen yet. And I've seen plenty. I always thought that there was a place for a good magazine dealing with the air and naturally it should have occurred to me that who but my good friend Mr. Gernsback should edit it.

BERTRAND HICKMAN,
Montclair, N. J.

(Another of the complimentary letters that have come to us about the first issue of Air Wonder Stories by Mr. Hickman. We are sure, that with the plans we have in mind for it that Air Wonder Stories will become a force operating toward the "greater glory" of aviation in this country and abroad.—Editor.)

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AVIATION NEWS
(Continued)

General

Refueling in Air Opens New Possibilities

BY the establishment this year of two new endurance records for planes, made possible by refueling in the air, the possibilities of improved service of commercial planes have been opened. Aviation executives are becoming interested in the idea, and also in the tests that have been made to allow a plane to make a pickup of personnel or fuel from the ground while in motion. Competition between airlines is becoming keen and the difference of an hour that represents the time for refueling on the ground may well represent the success or failure of an airline.

Complete Weather Reports for Air-Rail Route

WHEN the Transcontinental Air Transport Company begins its forty-eight hour air-rail service between New York and the Pacific Coast it will have a complete weather determining bureau all its own. There will be ten regular meteorological stations between the terminals at Columbus, Ohio and Los Angeles and seventy-five additional observation stations along the route and on all the points to the north and south, so that no unexpected change may come. Each of the main stations will be manned by a trained meteorologist who will forward complete weather reports of his particular area to other points along the line and to pilots before they leave the next landing field. A complete radio system will inform pilots and other stations of any unexpected change. Four questions will be answered by the weather service. What weather conditions prevail at the destination, what conditions will be encountered along the route, what and where changes will occur and at what altitude most favorable flying conditions will be found.

Air Train Seen as Possible Now

WITH experiments going forward in Germany with the towing of gliders by motored planes, the prospects of having "air trains" seem to become upward. In the German tests two or three gliders were attached to a string after the motored plane which supplied the power. What has been planned is that such a train, each plane loaded with freight and having no pilot except in the motored plane, might set out across country and each of the gliders be "unhitched" at its destination to glide automatically to a landing field. Recent successful tests of the pilotless gliders have been made by the National Air Transport, according to Reginald M. Cleveland in the New York Times. A plane was operated for thirty minutes continuously without assistance from the pilot except occasional pressure on the rudder bar. A vane is supported on the upper wing, in the automatic device, and points into the wind. A pendulum extending from the interior of the fuselage and the vane, is connected to two motors, one controlling the ailerons and the other the elevators. A longitudinal or lateral motion of the plane causes a similar motion of the vane and pendulum which actuates the motors and restores the stability.

Aviation's Past and Future

"THE strongest and most important organization in America dealing with aviation is the Society of Automotive Engineers, and it is not unlikely that aeronautical engineering may in the future become the major activity of the Society," according to Prof. J. M. Parkin, who is in charge of aeronautic and research work in the faculty of applied science and engineering of the University of Toronto.

Professor Parkin recently reviewed the progress made by aviation during the last 20 years in an address before the Canadian Section of the Society. He reminded his audience of Blériot's flight across the English Channel 20 years ago in a small monoplane powered by a three cylinder 35 horsepower engine. During the same year, the first international aviation meet was held at Rheims, France, at which the following records were established: speed, Curtiss, 47 miles per hour; altitude, Latham, 508.5 feet; and distance, Farman, 118 miles in 3½ hours. Corresponding records today are 319.57 miles per hour, 36,000 feet, and 4,417 miles.

Radio Directional System to Chicago

BECAUSE of the bend in the air route to Chicago caused by Lake Michigan, it has been necessary to install a radio range beacon at Goshen, Ind. and a marker beacon at Chicago. There will be no directional beacon at Chicago. Planes eastbound from Cleveland will follow the west beam from there until the east beam at Goshen is picked up and then followed to the source. Goshen's west beam will then be followed and marker beacons at Lansing, Ohio and Calumet, Ind., will be picked up until the Chicago beacon is reached. Thus the complete New York-Chicago radio beacon system will be completed.

Human Element Causes Most Accidents

A SURVEY by the Department of Commerce of the causes of accidents to aircraft during the latter half of 1926 revealed that very few accidents are caused by structural failure of the plane. In fact, during that period no such structural failure occurred. Only 15 per cent. of the accidents were caused by motor failure, while the failure of the human equipment accounted for more than half of the accidents. The figures seem to indicate that stricter rules are necessary for pilots, better training, and rigid enforcement of all rules pertaining to the pilots. The weather and airport hazards also showed a gratifying decrease from the last period studied.

Inclined Runway for Plane

A DEVICE to enable a plane to take off from an inclined runway has been made by C. Francis Jenkins, noted aeronautic inventor. Believing that planes are capable of maintaining in the air a greater weight than they can take off with, he has constructed the chute at the top of which the plane stands when ready for the take-off. It slides down the chute and when it reaches the end it has a speed far greater than that necessary for the take-off. This, in the inventor's opinion, will eliminate the necessity for large fields to supply the necessary space for the usual take-off. Airport operators therefore will not have to go so far from the centers of population to find such a field. Jenkins is also the inventor of a method of reversing the motion of the propeller so that a plane may have a braking effect exerted on it after reaching the ground, thereby reducing the space necessary for landing.

Mitchell Denounces Coolidge Air Policy

A THOROUGH denouncing of the air policy of the Coolidge administration is contained in *Government* in an article by General William Mitchell, former commander of the Air Force of the A. E. F. and Director, Military Aeronautics, U. S. Army. General Mitchell's indictment is directly thrown against the policy of having the development of aviation in the country divided among the Commerce, Navy and Army Departments instead of centralized under an Aeronautics Department. "We are entering an aeronautics era," says Mitchell, with airplanes constantly attaining new records for flight speed, endurance. The supremacy of the air in time of war has been established. From the lessons of tests made in 1921 on battleships he believes that "no ship can live on the surface of the water in the face of powerful." And in land warfare their supremacy is also unquestioned. "Three or four 4-ton phosgene or mustard gas bombs from airplanes launched 100 miles from New York and hitting on Manhattan Island will cause absolute and immediate evacuation of the city."

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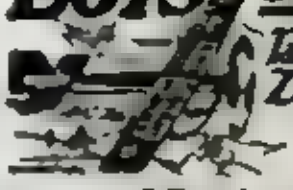

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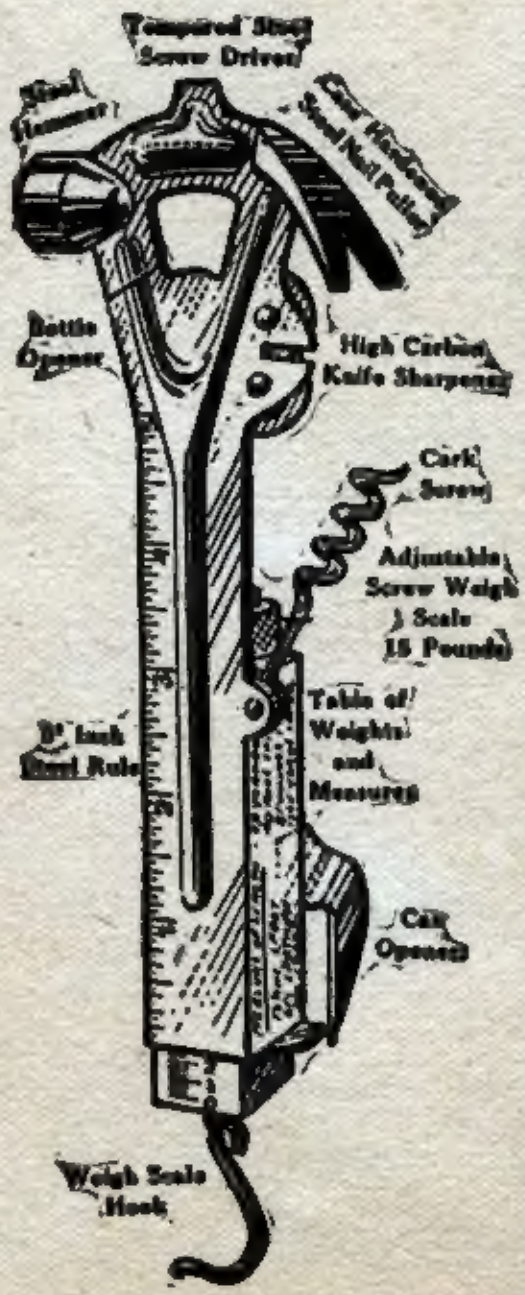

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AVIATION NEWS

— GENERAL (*Cont.*) —

"Soaring Bird" Invention Ridiculed 43 Years Ago

IN the sessions of the august American Association for the Advancement of Science, 43 years ago, a Professor Lancaster presented a paper proving that man might fly by use of a mechanical contrivance. The professor brought before the society a number of diagrams showing that flight was possible providing the power plant necessary could be obtained. Physicists and mathematicians laughed at the old man. When he came before the convention again, his paper was censored and when he attempted to read it, he was ordered to leave the rostrum.

(The lesson of this should sink deeply. We sophisticated moderns today scoff too easily at proposed inventions that seem revolutionary.—*Editor.*)

Man Has Always Desired to Fly Says Historian

THE desire to fly has not been a recent acquisition of man, concluded Dr. Berthold Laufer who has just written "The Prehistory of Aviation," which has been published by the Field Museum of Natural History of Chicago. Dr. Laufer traces back through man's known history the influence of the desire to be in the air, and he finds that many mythical heroes have been endowed with the ability to fly. "Our airplanes," he says, "can trace their pedigree back to the kites which originated in China. Our modern progress with aviation has its background in the gradual evolution of ideas, and the experiments, triumphs and failures of many ages." An imperial flyer, he says, opened up the history of China, and a royal flyer opens up the first chapter of Britain's history. There are tales about aerial cars floated by copper globes holding a vacuum, and propelled by sails and oars. From India there comes the story of early attempts at the construction of a dirigible. Man, it seems, has always been envious of the birds.

Future Airports to be Triangular Says Expert

FROM the necessity of having airports so shaped that planes may land in them from any direction, the future airport will probably be shaped as an equilateral triangle, said Gaven Hadden at the first annual meeting of the Airport Section of the Aeronautical Chamber of Commerce. For with a triangle a greater amount of landing possibilities are afforded with the minimum of area required. He mentioned also that the increased capacities of landing fields necessary to take care of increasing number of planes would tax the fields soon. Not only adequate lengths of fields are necessary but also adequate widths. F. C. Hingsburg, of the Department of Commerce, stated that weather service over the secondary air network of the country would be available on July 1. Three hundred airports would gather weather data on a three-hour basis, forward it to Weather Bureau stations whose maps would be made and the data broadcast over the radio. Any airport located near an airway radio station then may tune it to receive reports on weather, visibility, ceiling, etc.

Strict Flying Rules Now Suggested

THE chances of accidents at airports where a number of machines may wish to take-off or land at the same time are very great unless strict flying rules are effected and enforced, according to the Department of Commerce. Taking a lesson from the great European airports, Tempelhof at Berlin, Le Bourget at Paris and Croydon at London, the Commerce Department has suggested a number of rules which should promote safety. One is that no plane shall be fueled while the engine is running. Another is that no plane shall taxi at faster than five miles per hour; blocks should always be placed in front of the wheels before starting the engine; the engine shall not be started unless a competent person is in the cockpit or at the controls. Safe distances must always be maintained between aircraft landing or taking off at the same time; lighting of the ports for night-flying shall be only in accordance with methods approved by the Department of Commerce; landing and take-off shall be made when practical into the wind. Many other regulations have been suggested regarding the method and time of take-off, and methods of rising and of landing.

(*Continued on page 191*)

AVIATION NEWS—*Cont.*

GENERAL—*Cont.*

New Seaplane Record in Germany

IN a recent test the seaplane speed record was topped by 15.1 miles per hour when Chief Pilot Starke of the Heinkel Airplane Works flying a Heinkel seaplane and carrying 103 pounds of extra weight made a speed of 171.28 miles per hour. Successful experiments in Germany with the catapulting of planes from battleships have also been made, and are claimed to give better results than the American method. Compressed air is used instead of powder. The plane rests on a sleigh and is put in front of the mouth of a cylinder containing compressed air. At a signal the air is released and the sleigh and plane are shot, in two-thirds of a second, over a bridge on rails greased with oil. At the end of it the plane has enough momentum to rise immediately. Six experiments were made and were all successful.

Cloud Heighth Measurer

AN indicator to mechanically measure the height of clouds (or ceiling) above an airport has been perfected by the Gray-bar Electric Company says *Air Transportation*. The indicator consists of a triangular shaped instrument mounted on a short galvanized pole having incorporated a scale graduated in feet and a revolving pointer. To get the height of the clouds, the ceiling projector is insulated thereby throwing a spotlight on the clouds. The operator sights along the pointer of the indicator at the spot-light and the height of the cloud is read on the indicator scale.

Ground Plane Trainer

A DEVICE developed at the Wright Field Experimental Flying Station will give an embryo aviator all the sensations of being in the air without moving off the ground, says *Science*. The "orientor," as it is called, is able to simulate the control apparatus of the cockpit of a plane; it has a propeller and engine to give the plane's basic movements. The daring aviator seated in the cockpit will hear the roar of the engines, the rush of air, and he will get the effects of loops and turns. The apparatus is electrically controlled.

BOOK REVIEWS

THE A B C OF AVIATION, by Victor W. Pagé, Major U. S. Air Corps Reserve, illustrated, 143 pages, stiff paper cover, size 5x7¼, published by Norman W. Henley Company, New York City. Price, $1.00.

For one who knows next to nothing about aircraft and wants to see whether he is innately "air-minded" this book is recommended. Although Major Pagé writes in a more-or-less matter of fact manner concerning the early development of aircraft and later successes, one gets a cumulative thrill from his pages. The book is as simply written as is possible yet it is never dry or uninteresting. And the profusion of illustrations, composing well over a third of the space of the book, gives the reader pictorially what the writer gives verbally.

The book is naturally divided into a discussion of the lighter-than-air and heavier-than-air machines. Each is gone into thoroughly showing the dynamic principles upon which they operate, their cruising possibilities and then the details of construction. Much that the reader has glimpsed vaguely through the newspaper columns will now become matters of actuality, once the principles of the feats the newspapers acclaim become understood.

Discussing the heavier-than-air craft, the writer analyses each part of the machine showing just what each contributes to the operation; and the details of construction. To one thoroughly unversed in dynamics or even in mathematics, so necessary to the aeronautical engineer, the principles of aviation become clear.

The book then is one that "whets" the appetite. Through the absorption of Major Pagé's hearty enthusiasm for aviation one becomes imperceptibly a convert. His curiosity breeds knowledge and his knowledge breeds confidence. Aviation no longer is the sport of the dangerous and reckless but a new, thrilling and as the whole safe means of transportation.

THE AIRPLANE AND ITS ENGINE, by Charles H. Chatfield and C. Fayette Taylor, 329 pages, illustrated, 6x8¼ inches, stiff buckram cover, published by McGraw-Hill Book Co., Inc., New York City. Price, $2.50.

Up to the present time books on aeronautical subjects have been divided into two classes—those that are written for the interest of the multitude, and those prepared for the engineer or technically trained persons.

To fill the gap that was evident the authors of "The Airplane and Its Engine" have presented a book which is especially recommended to that great majority of readers who are more than mildly interested in the science and practice of aviation.

Several chapters in this book are devoted to the fundamentals of airplane design. The presentation of the factors governing design with the absence of complicated formulae, cannot but help to inform the seriously interested reader of the importance of a thorough knowledge of aerodynamics so vital to the success of an airplane design.

The writers give complete discussion of present day aircraft engines. The discussion covers not only general principles of the internal combustion engine but goes further in disclosing certain features of great importance that are required in the adaption of a power plant in aircraft.

Additional chapters of the book give the reader a full understanding of the modern airplane, and types of construction that have proven themselves to be practical. In closing, this work presents a complete description of modern navigation instruments.

EVERYBODY'S AVIATION GUIDE, by Victor W. Pagé, Major, U. S. Air Corps Reserve, 247 pages, illustrated, stiff cloth covers, size 5x7¼, published by Norman W. Henley Company, New York City. Price, $2.00.

This book like the "A B C of Aviation" is a book for beginners. In fact most of the material is the same, as well as the illustrations. But Major Pagé has interestingly arranged the book in the form of some 600 questions and answers, so that one gets his knowledge, in a sense, conversationally.

The book is recommended as a desk or library reference, for it provides an easy manner of looking up some moot or disputed point on aviation or its history.

An index in the back allows one to find in a moment the subject of interest. There is also in the back a compendium of the various world's records in aviation for various types of craft. One who is used to hearing in a confused way of new records being broken every week finds it explained when he discovers the fineness with which the various craft are classified.

AVIATION AND ALL ABOUT IT, by A. Frederick Collins, 260 pages, illustrated, stiff cloth covers, size 5x7½, published by D. Appleton & Company, New York City. Price, $2.00.

This is another one of the good elementary books on aviation that has come to our desk. It differs somewhat from the others reviewed in this issue in that the author devotes quite a bit of space to the making of models of planes, and the construction of little flying devices. In fact, for one who wishes to learn about aviation practically and at first hand, the construction of such models will serve as a practical, economical and interesting experience. The writer gives not only the dimensions necessary for each part but also the cost of each element.

The history of aviation, its great development during the World War and the present status of the industry are all treated liberally by the author. He has also much material about the application of various instruments to aircraft, notably the wireless, and also the elements governing the construction and operation of airports and airways.

The uses of airplanes also receive the author's attention with some fairly detailed material on the passenger airways that have been developed and the extension of existing air routes.

Regarding the question that must be uppermost in the minds of the average air enthusiast, "when will individual flying become general?" the author has a very interesting statement.

"Piloting one's own airplane," he says, "is not likely to become a popular mode of travel either for business or pleasure until some scheme for automatically stabilizing the plane has been developed. The machine must be designed so as to be inherently stable—that is, if a gust of wind strikes it and turns it over, or if it should stall or start to fall, it would right itself before reaching the ground and land as gently as a parachute."

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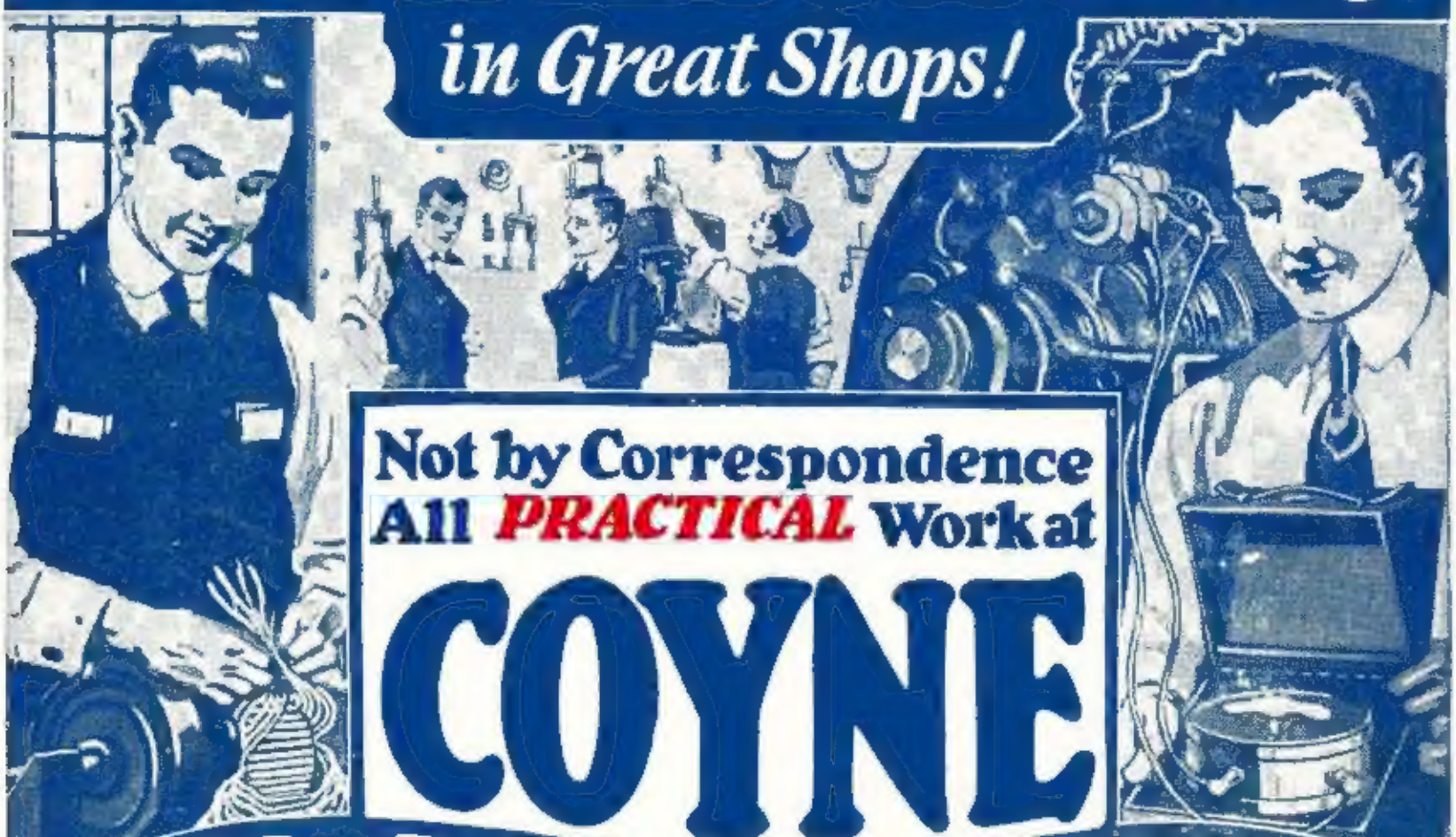

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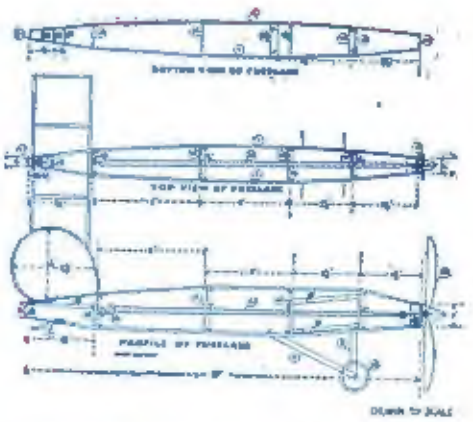

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